Dam Catalog
and
Dambreak Model

User's Guide

—

OB2

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NWS Office of Hydrologic Development

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I. Preface

The Dam Catalog (DamCat) application was developed by the Colorado Basin River Forecast Center (CBRFC) and obtained by the National Weather Service/Office of Hydrologic Development (NWS/OHD) for the national AWIPS software baseline as part of OHD's RFC Development Management (RDM) activities. DamCat was prepared by OHD for AWIPS Release OB2 and will be deployed to all AWIPS WFOs and RFCs with custom local data subsets. It will replace the existing DamCat functionality in the AWIPS Weather Forecast Office Hydrologic Forecast System (WHFS) and eventually will hold the National Inventory of Dams (NID) national database of 76,912 dams. Each office will initially receive the parameters for four scenarios for one dam and one down stream location when DamCat is delivered.

The DamCat software enables each office to edit the database tables, and to update the DamCat parameters using the Simplified Dambreak Model included with DamCat. To make sure that the DamCat values are appropriate for each dam, Weather Forecast Offices (WFOs) should review and account for variations in dam geometry, local geographic topology and location of communities as well as high value structures downstream of each dam. With this updated data, offices have the ability to insure that the crest wave height and time of travel for important downstream areas are representative and effective.

ii. Conventions

Bold Italic   Main Paragraph Headings

Tool bar Hyperlinks: The User's Guide shows how the GUI links in Dam Catalog appear by using the same color scheme as the GUI to depict various operations. When an option is selected within a Dam Catalog toolbar, it is in *italics* and displayed in pink. Unselected links are **underlined** and purple. Whenever the term select or selecting is used in the Users Guide, that means to left mouse click on the hyperlink item to be selected when running DamCat in AWIPS.

Italic   *Used highlight window names, toolbar names and important items*

URL References   Hyperlinks to web or internal to the User's Guide.

Special Column Names:

Display Fields   Indicates a Dam Catalog parameter name as displayed on screen or printed in a product message.

Database Fields   Indicates a Dam Catalog parameter field name as used in the Dam Catalog Informix database. A cross reference table is provided in the Technical Reference Appendix.

1. Overview

DamCat uses a GUI application that executes within the AWIPS-supplied Netscape web browser using Tcl/Tk, CGI, and an Informix relational database. Through the GUI you can view Dambreak parameters for each selected dam; generate new Dambreak values by running the HL Simplified Dambreak Model program written in Fortran; and disseminate NWS formatted products using standard AWIPS communications software.

Purpose
- Provides a catalog (database) of physical dam characteristics and dam break parameters.
- Provides intuitive GUI to navigate the catalog.
- Provides editing feature for every table in the database via input form (New).
- Provides ability to run alternate dam break model scenarios (New).
- Provides means to quickly create and distribute dam break user products (New).

Dam Break Model Flexibility
- There can be one or more break scenarios (e.g., based on initial volume and time to fail) from one or more sources or models
- There can be one or more down stream locations with each location having one or more cross-section types (e.g., observed/computed).
- The user can update basic dam reference information.

1.1 Organization of the User's Guide

The Dam Catalog and Dambreak Model User's Guide is divided into 8 sections and four appendices.

The first two sections describe how to get started. Sections 3 through 7 describe the User interface to DamCat in detail and section 8 addresses problem areas. Appendices A, B, C and D contain useful reference material for understanding DamCat parameters and maintaining the Database.

Sections

1. Installing DamCat   <- Post OB2 Installation instructions from OH
2. Starting DamCat   <- Basic startup.
3. Dam2 Station List Menus   <- List basic information for selected or all Dams.
4. [Name of Dam - ID]   <- Entry Window to Dam Catalog Interface
5. Dam Catalog   <- View Dam Catalog Info for Specific Dam.
6. Dambreak Model   <- View Dambreak Info for Specific Dam.
7. Edit Catalog   <- Edit Specific Dam information in Catalog
8. DamCat User Notes   <- Problems and Solutions.

<u>Appendices</u>

A. DamCat Menu Layout   <- Menu Flowchart
B. DamCat Database Specs <- Database Specifications
C. DamCat Maintenance   <- Installation and Maintenance of Database
D. DamCat Cross Reference <- Definitions and Database Cross Reference

The final form of this manual was developed by the Southeast River Forecast Center and WFO Tallahassee in coordination with the Office of Hydrology.

2. Installing Dam Catalog

This new version of Dam Catalog includes new directories and database implementation / maintenance scripts. The new directories and scripts are included with the AWIPS Build OB2 upgrade package. As soon as OB2 has been implemented at a site, the new DamCat database may be downloaded, installed and implemented at that site.

See the latest instructions for downloading and installing your Dam Catalog and Application Data at the following URL:

http://www.nws.noaa.gov/oh/hod_whfs/index.html

3. Starting Dam Catalog

The Dam Catalog is web based application using the INFORMIX database.

Running DamCat Application

The DamCat application displays an HTML script in Netscape on AWIPS.
DamCat can be started any of three ways:

1. From the *command line script* "run_damcat".   This assumes the path includes /awips/hydroapps/whfs/bin. The *command line script* works on the local workstations (ws1, ws2... etc).

2. From the AWIPS D2D menu. (Add the *command line script* to the Hydrology Menu. This can be done by the AWIPS Focal Point, Systems Administrator or other qualified staff.)

3. From a Netscape Browser bookmark. Run Netscape from the D2D menu and bookmark the following link:

>   http://as1f/cgi-bin/ohd/dambrkdocs/dam2/dam2list.cgi

When DamCat is started, the Dam2 Station List "Main Dam2 Station List Window" appears. The user can display and sort lists of dams using this window.

Location of Data Files

On AS-1, DamCat saves a variety of files in the following directory:

>   ***/awips/fxa/htdocs/cgi-bin/ohd/dambrkdocs***

4.Dam Catalog - Dam2 Station List

This section discusses the Dam Catalog "Search", Sort", and "View All Records" options in the "Dam2 Station List" window. which is opened when the application starts.

4.1 Main Dam2 Station List Window
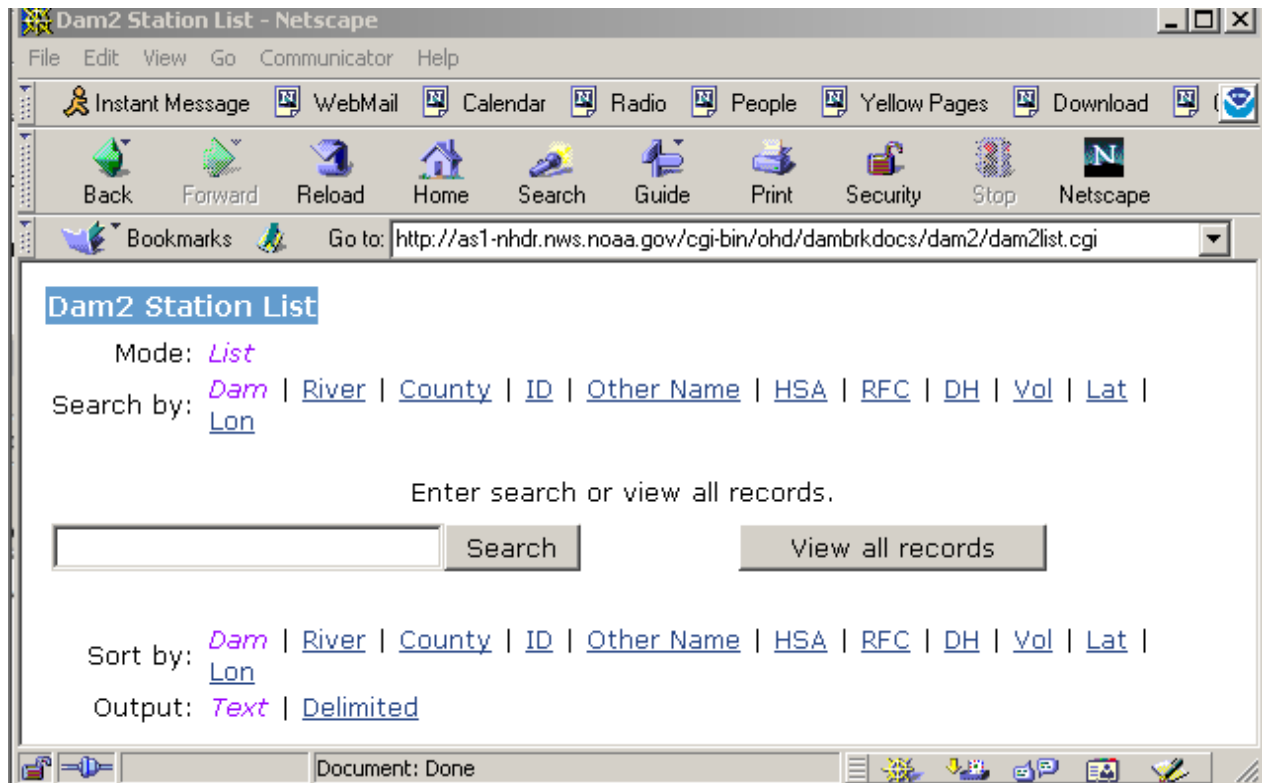
Fig 1. Main Dam2 Station List window

Defaults

Mode:	List
Search / Sort by:	Dam
Output:	Text

Toolbars

The "Main Dam2 Station List" window consists of three tool bars: "Search by" and "Sort by" and "Output". There is also a "Search" input box to type in a character string which is used by the "Search by" toolbar.

A search and sort operation is conducted on the entry in the "Search" input box each time a category is selected (clicked on) in either the "Search by" or "Sort by" toolbars, or if the user depresses the < return after making an entry in the "Search" input box or the user clicks on the Search button.

The returned list displays all 11 categories of information for all Dams matching the input string typed into the Search input box. The list is "Output" to the screen either in plain "Text" or pipe (|) "Delimited" format.

Categories of Information

Dam	- Official dam name, or the popular (Other Name) name.
River	- Name of the river
County	- FIPS code of county in which dam is located
ID	- Dam ID
Other Name	- The popular Other Name
HSA	- Hydrologic Service Area
RFC	- River Forecast Center
DH	- Down Stream Hazard. L=Low, S=Significant, H=High
Vol	- Starting volume (acre-ft) of reservoir
Lat	- North latitude coordinate of dam
Lon	- West longitude coordinate of dam

When DamCat is executed, a new Netscape screen window will appear on the D2D. The DamCat screen enables the user to display a sorted list of any number of Dams within the Database using the "Search by" and "Sort by" toolbar categories. Every time a toolbar category is selected, the selected category is *highlighted* and search/sort operation is performed on whatever has been typed into the Search input box. The default mode is *Dam* for both toolbars. The resulting list displays 11 categories of information: Dam, River, County, ID (NIDID), Other Name, HSA, RFC, DH, Vol, Lat, and Lon.

Hint 1:
Both toolbars are used together to determine what is listed and how the list is sorted. The top toolbar "Search by", selects the type of data you want to search for. The bottom "Sort by" toolbar sorts the data according to the "Sort by" category selected. Each time a search is conducted, the returned list is in the sort order selected in the "Sort by" toolbar. After a list is displayed, the "Sort by" tool bar can be used again to change the sort order.

Hint 2:
You don't need to type in the whole name or number to do a search on any of the "Search by" categories. For example, if you typed in "Chatta" when doing a search with the River option selected, only those Dams associated with the word string "Chatta", somewhere in the River name, will be listed. Mostly likely only Chattahoochee River would show up in this case.

Hint 3:
Searches are case-<u>in</u>sensitive, i.e. the upper and lower case letters work the same.

Hint 4:
Please review the "User Notes" section regarding using the search and sort.

4.1.1 "Search", "Sort" and "View" options
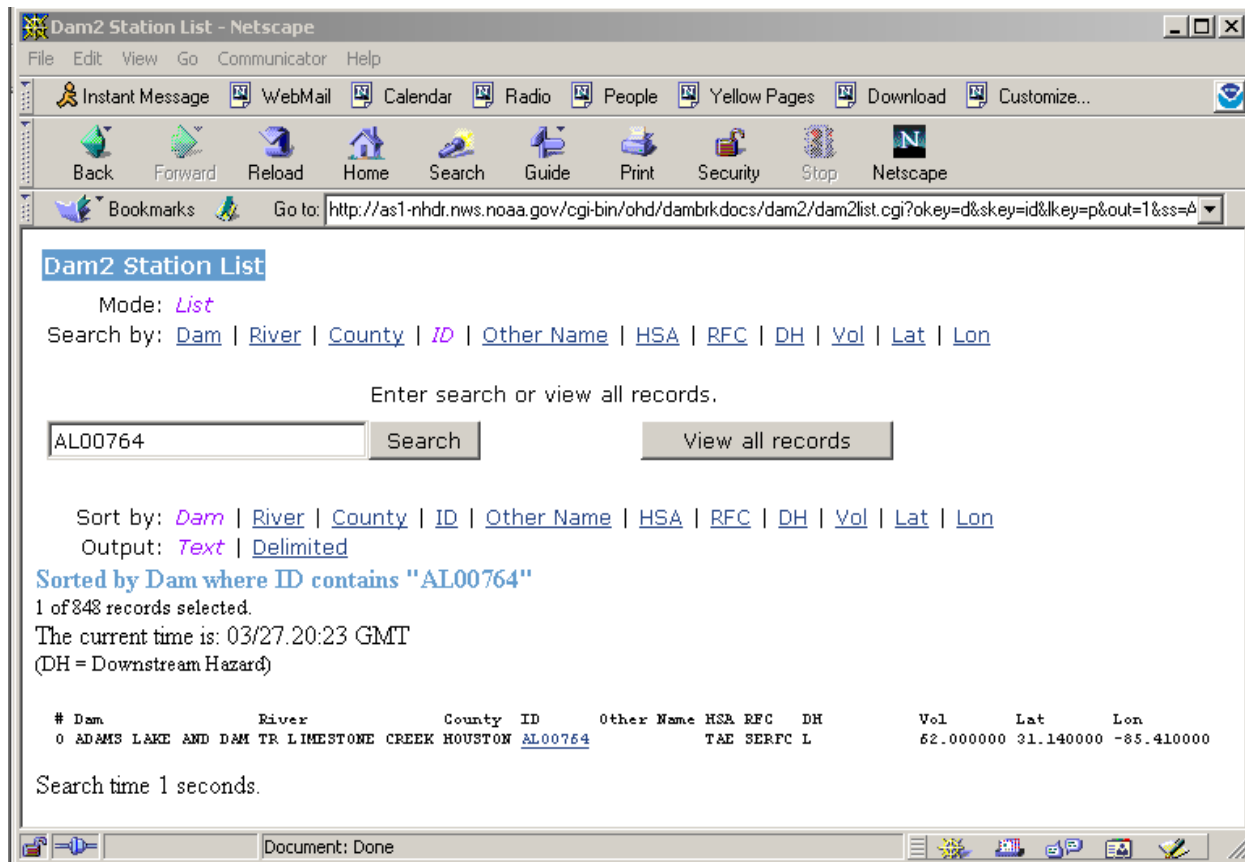
Fig 2. Search and Sort options in the Dam2 Station List window

How to do a Search and Sort:

1) Type an entry into the Search Button text box. It should match the highlighted category in the "Search by" toolbar.

2) Run the search and sort. Options: Hit return on the entry in the Search button text box (initial default is *Dam* for both search and sort); or click on the Search button (initial default is *Dam* for both search and sort); or click on any of the "Search by" toolbar categories (Changes search category), or click on any of the "Sort by" toolbar categories.

Example for Fig 2:

Search Button Text Box:	Type in the Dam ID. **AL00764**
"Search by" toolbar:	Select the *ID* category.
Output:	As soon as the ID category is selected, the "Search by" *ID* and "Sort by" *Dam* is performed.

In this example one record for [Adams Lake and Dam] displays in *Text* format.

4.1.2 "View All Records" option
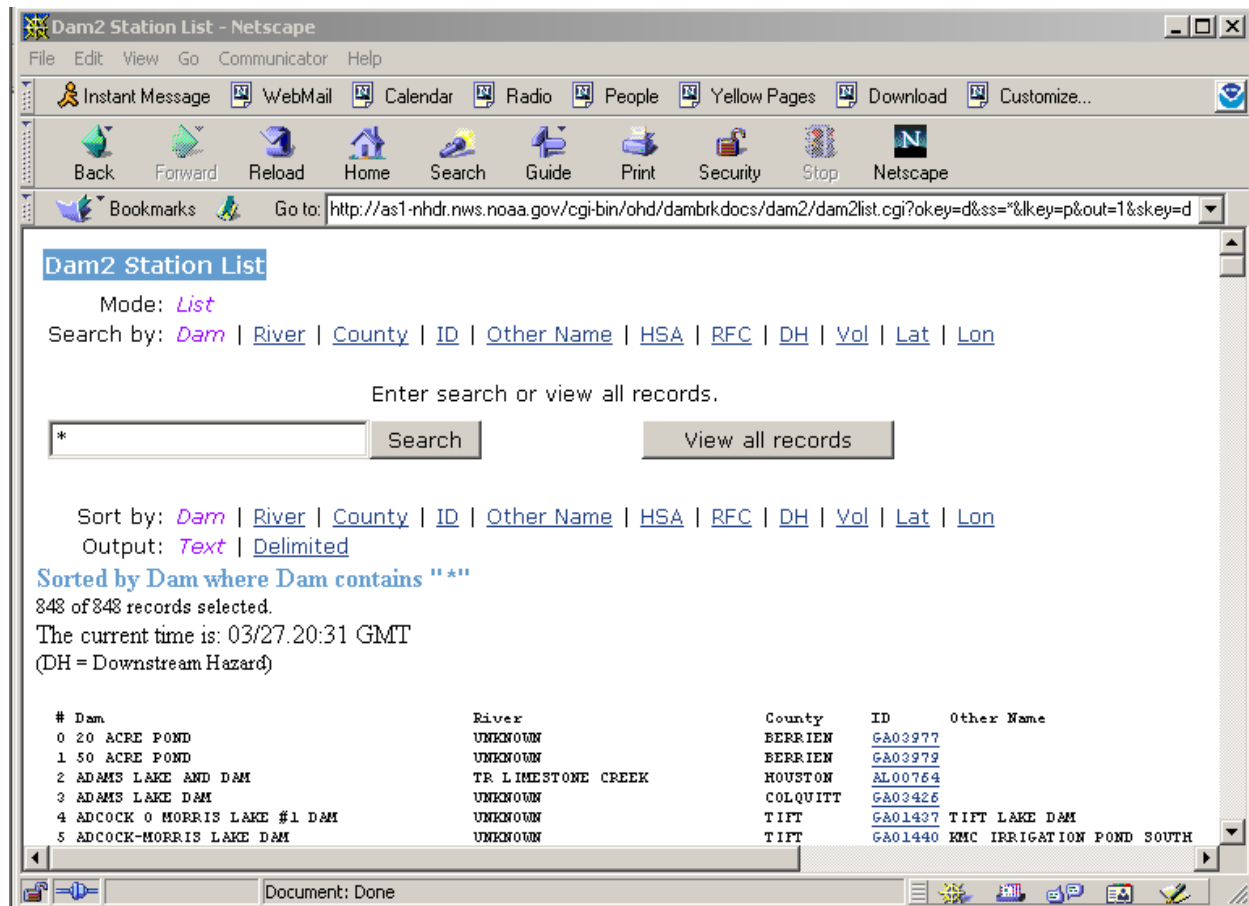
Fig 3.   View All Records window. *(Only part of Stations List is shown in Fig 3).*

How to display all the records:

1) Click on the "View all records" button.

2) An asterisk is automatically inserted into the "Search Button" text entry box.

3) All records display in the Output format selected (Text or Delimited). Only the 11 categories of information for each record will be displayed.

4) Alternatively you could simply type in an asterisk in to the text entry box and click on the "Search" button or any of the "Sort by" Toolbar categories.

5) You can sort the list as well by using the "Sort by" toolbar.

Notes on Dam2 Station List Window:

1) There are twelve columns. The first column is a numerical index number that always begins with 0. The number for last line listed will always be one less than the total number of dams found.

2) A label with the Month/Dat/Time (Z) of the time of the search/sort run will appear.

3) The records displayed in the Dam2 Station List are stored as a text file on AS-1 in the following directory:

   /awips/fxa/htdocs/cgi-bin/ohd/dambrkdocs/station/dam2/data.

This file is temporary. It is overwritten with each new search performed and is purged periodically by the system.

5. *Simplified Dambreak Catalog Interface*

5.1 Overview

To enter the *Simplified Dambreak Catalog Interface* select a Dam of interest from the *"Dam2 Station List"* by clicking on that dam's **"ID Number"**. When a particular dam is selected this way, an *"Entry Window"* appears with a banner that displays the name of the Dam and NIDID.

Entry Window

Click on **"Dam Catalog Interface"**
to enter the *"Info Mode Window"*.------->

ADAMS LAKE AND DAM – AL00764

Simplified Dambreak
Dam Catalog Interface

Dam Information

5.2 Entry window [Name of Dam - ID]
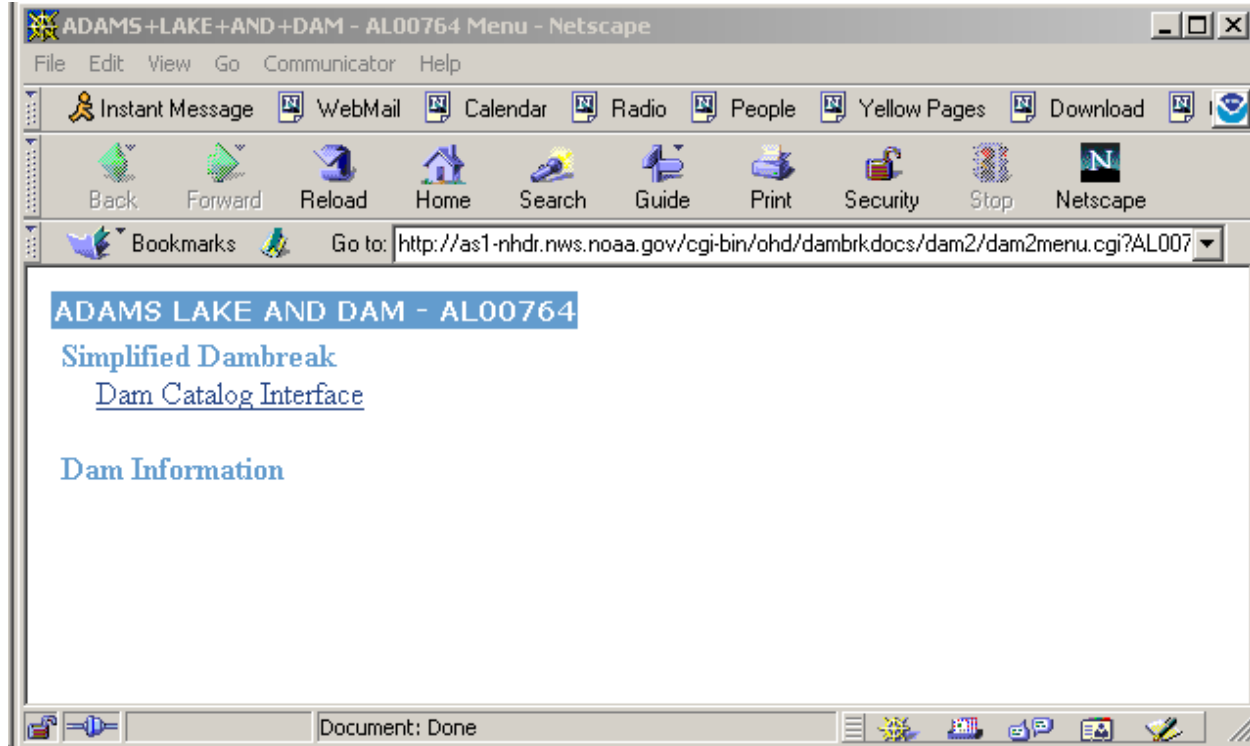
Fig 4.   Display name of Dam selected for viewing, editing and running Dambreak

Select: **"Dam Catalog Interface***"* to begin session on displayed dam.

By selecting **"Dam Catalog Interface"**, an *"Info Window"* will open with a *"Mode"* and *"Table"* toolbar. Select the *"Info"* mode desired by using the "Mode" toolbar.

See Fig. 5 below.

6. Dam Catalog Interface

6.1 Overview

Dam Catalog Interface window has several "Info" modes:

      View Catalog Info   <-------------   View Dam Catalog information
      View Dambreak Info   <-------------   View or run Dambreak Model
      Edit Catalog Info   <-------------   Enter new Dam or Edit existing Dam information.

Each Info mode has its own unique set of tool bars. The user should take time to familiarize themselves with each mode, since the format varies.

     View Catalog Info - Allows the user to view the entire Dam Catalog database. The database contains detailed information on each dam including input data used to generate various dambreak scenarios and the results from dambreak model runs. This section is useful for quickly obtaining crest and travel time information for preparing Flash Flood warning templates in RiverPro in advance.

     View Dambreak Info - Allows the user to view the existing Dam Catalog database or run a dambreak scenario based on data within the Dam Catalog database. New dambreak scenarios can be entered through the Edit Catalog Info mode interface. A test in-house message or a real message (transmitted on AWIPS) can be generated for selected dambreak scenarios stored in the Dam Catalog. The generated message contains detailed technical information about the crest wave, and is intended for official use.

     Edit Catalog Info - Allows the user to edit any of the Dam Catalog Data or enter new Dam Catalog Data. Updated or new dam data entered within this mode, may be processed by the Dambreak Model within the **View Dambreak Info** mode. The resulting output data from each run by the Dam break Model is stored within the Dam Catalog for display, message generation or printouts.

6.2 View Catalog Info

6.2.1 "Info"

Fig 5. Display Catalog Table Information (Dam, Offices, Construction, Regulatory)
(Only part of Table is displayed)

Window

The Dam Catalog Interface window (Fig 5.) is labeled with a blue banner showing the name of the Dam and Dam's ID. Below the banner are two toolbars labeled "Mode" and "Table".

Toolbars

"Mode" toolbar: Shows hyperlink selections for **"View Catalog Info", "View Dambreak Info", and "Edit Catalog Info".** "Table" toolbar: Shows hyperlinks selections for **"Info", "Inputs", "Downstream Points", "Cross Section Pairs", and "Outputs".** *"View Catalog Info"* and *"Info"* are the default selections in these two toolbars.

"Table" toolbar is associated with the "Mode" toolbar. If you select a different "Mode" such as **"View Dambreak Info", or "Edit Catalog Info"** a whole new set of toolbars with new hyperlinks will appear. This will be apparent as the user reviews the manual.

Info Table Information

The Info Table displays information from the damcat_dam INFORMIX table. This information is listed in four sections: Dam, Offices, Constructions, Regulatory.

    Dam - contains informational data of the dam: its name, ID, location, latitude, longitude, elevation, which topographical map was used, drainage area, etc.

    Offices - contains information about the responsible RFC - River Forecast Center and HSA - Hydrologic Service Area.

    Construction - contains such technical data of the dam and reservoir as the dam type (earth, concrete, etc.), height of the dam, reservoir storage volume, dam length and maximal discharge, etc.

    Regulatory - contains the owner, inspection and type of agency information, etc.

The specific fields within each category are listed below. Each field name within this User Guide is hyperlinked to the description tables in the Technical Appendix.

Dam

Field	Units
NID ID	Numeric ID
Dam Name	
Other Dam Name	
Former Dam Name	
State ID	
River	
County	
Latitude	Decimal Degrees
Longitude	Decimal Degrees
Elevation	ft MSL
Topo Map	
Return Flow Region	
Drainage Area	mi2
Prebreak Available	
Comments	
Updated	

Offices

HSA	Hydrologic Service Area
RFC	River Forecast Center

Construction

Dam Type	
Dam Height	ft
Structural Height	ft
Hydraulic Height	ft
NID Height	ft
NID Storage	acre-ft
Max Storage	acre-ft
Normal Storage	acre-ft
Dam Length	ft
Surface Area	acre
Max Discharge	cfs
Volume Material	yd3
Core	
Foundation	
Spillway Type	
Spillway Width	ft
Outlet Gates	
Number Locks	
Length of Locks	ft
Width of Locks	ft

Regulatory

Field	Units
Owner Name	
Owner Type	
Year Completed	
Year Modified	
Purposes	
Dam Designer	
Private on Federal Land	Y / N
Downstream Hazard	H, M, L
Emergency Action	Y / N
Inspection Date	mm/dd/yy
Inspection Frequency	
State Regulated	Y / N
State Regulatory Agency	
Federal Funding	
Federal Design	
Federal Construction	Y / N
Federal Regulatory Agency	
Federal Inspection	
Federal Operation	
Federal Owner	
Federal Other	
Source Agency	
Section T R	

Data Source & File Storage

When the "Table" toolbar hyperlink **Info** is selected, the data from the INFORMIX table damcat_dam shown in the preceding four categories is stored in the following file and displayed in fig. 5

[station ID].damcat_dam.[date-time]..data

The ".." in the file name above implies that there is an empty field. The field that normally occupies this location is known as the "Keys" field.

Files are stored in */awips/fxa/htdocs/cgi-bin/ohd/dambrkdocs/station/dam2data/data.*

The data in the file is concatenated and not easily readable. However, it may be possible to write a script to extract the data for local use.

6.2.2 "Inputs"

Fig 6. Display catalog Model Input information for the four Scenarios (HF, HN, MF, MN) (Only part of Table is displayed)

When *"View Catalog Info"* and *"Inputs"* are selected, the *Model Input* table displays information about the four main "Scenarios" created during Dambreak model runs and stored in the Dam Catalog. "Scenario" defines the type of the dam failure.

"HF" - high fast,
"HN" - high normal,
"MF" - medium fast,
"MN" - medium normal.

Since there may be more than one office storing a Dambreak model run, a variable number of source/scenario combinations may be listed.

Input Table Information

The Input table contains information from the damcat_dam and damcat_in INFORMIX tables:

Field	Units
*Source	Originating office.
*Scenario	HF, HN, MF, or MN
*Starting Water Surface	ft MSL (ft above Bottom of Dam ft MSL)
Dam Elevation	ft MSL (ft above Bottom of Dam ft MSL)
*Bottom of the Breach Width	ft MSL (ft above Bottom of Dam ft MSL)
Bottom of Dam	ft MSL
*Starting Volume	acre-ft
Max Storage	acre-ft
*Starting Surface Area	acres
*Time of Failure	min
*Additional Flow to add	cfs
*Final Breach width	ft
*Dam Type code	See appendix.
Comments	

Data Source & File Storage

When the "Table" toolbar category **Inputs** is selected, data from the INFORMIX tables damcat_in and damcat_dam are stored the following two files and displayed in fig. 6

[station ID].damcat_dam.[date-time]..data
[station ID].damcat_in.[date-time]..data

The ".." in the file name above implies that there is an empty field. The field that normally occupies this location is known as the "Keys" field.

Files are stored in */awips/fxa/htdocs/cgi-bin/ohd/dambrkdocs/station/dam2data/data.*

The data in the file is concatenated and not easily readable. However, it may be possible to write a script to extract the data for local use.

Note: Only * Inputs are actually used in the Dambreak Model.

6.2.3 "*Downstream Points*"

Fig 7. Display catalog Downstream Points (Only part of Table is displayed)

When *"View Catalog Info"* and *"Downstream Points"* are selected, the Downstream Points table displays information about downstream points, sources, point numbers, and cross-section types used to create the stored Dambreak model runs for all the scenarios listed in Fig 6. Since there may be more than one office storing a Dambreak model run, a variable number of downstream points, cross section types and source/scenario combinations may be listed.

Downstream Point Table Information

The Downstream Point table contains information from the damcat_dam and damcat_down INFORMIX tables:

Field	Units
Name	Name of the downstream point
Source	Office generating downstream points.
Point Number	Sequence Number for site below dam (at the dam = 0),
Cross Section Type	Origin of cross section First character describes the general "class" Second character (numeric) describes the method.

Downstream Point Table Information (Continued)

Field	Units
Distance from Dam	Miles to point of downstream interest or town
Latitude and Longitude	Decimal Degree location of downstream point.
Elevation	ft MSL of the downstream point
Flood flow	cfs
Flood depth	ft MSL
Off Channel Mannings N	
Comments	
Updated	

Data Source & File Storage

When the "Table" toolbar category **Downstream Points** is selected, data from the INFORMIX tables damcat_dam and damcat_down are stored the following two files and displayed in fig. 7.

[station ID].damcat_dam.[date-time]..data
[station ID].damcat_down.[date-time]..data

The ".." in the file name above implies that there is an empty field. The field that normally occupies this location is known as the "Keys" field.
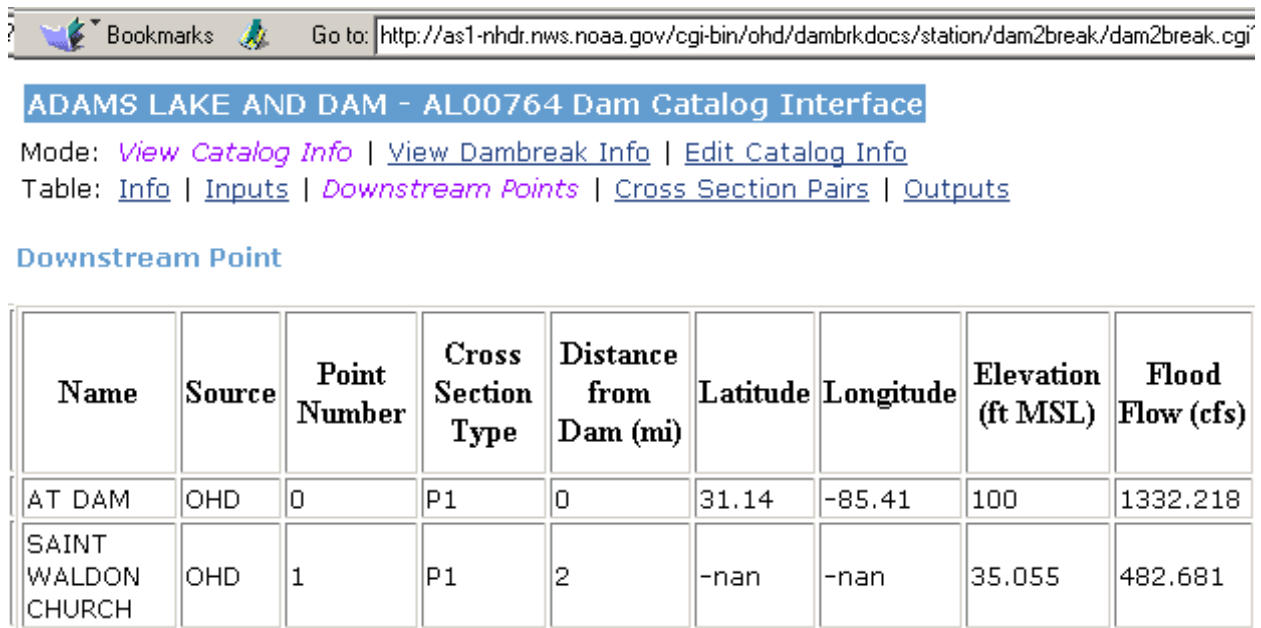
Files are stored in */awips/fxa/htdocs/cgi-bin/ohd/dambrkdocs/station/dam2data/data.*

The data in the file is concatenated and not easily readable. However, it may be possible to write a script to extract the data for local use.

6.2.4 *"Cross Section Pairs"*

Fig 8. Display Cross Section Pairs   (Only part of Table is displayed)

When the *"View Catalog Info"* and *"Cross Section Pairs"* are selected, the **Cross Section Pair** table displays information about cross section pairs, sources, point numbers, cross section types, and pair numbers. The number of combinations listed will vary depending on number of downstream points, number of cross section types, number of pairs and number of offices creating cross section pairs.

Cross Section Pairs Table Information

The Cross Section Pairs Table contains information from the damcat_in and damcat_pair INFORMIX tables:

Display Field	Units
Source	Office which created the cross section pair.
Point Number	Sequential number for sites (downstream points) below the dam beginning with the Dam which is specified as = 0.
Cross Section Type	Type of cross section. The first character describes the general "class", the second character (which is a number) describes the method used. (e.g. C - computed, O - observed, P1 - parabolic method 1)

Pair Number	Sequential number assigned to cross width - elevation lines (Top Width) assigned to each cross section line. Pair numbers always begin at 0 nearest the channel bottom and increase by 1 as you go up in elevation for each channel cross width - elevation (Top Width) pair. Note that for every cross section there will be many cross width - elevation (Top Width) pairs that describe the cross section.
Elevation	Elevation of a particular cross width - elevation line pair (MSL ft)
Top Width	Length of a particular cross width - elevation line pair. (ft)
Mannings N	Mannings N for the pair
Inactive Width	Inactive width of the pair.

Data Source & File Storage

When the "Table" toolbar category **Cross Section Pairs** is selected, data from the INFORMIX tables damcat_in and damcat_pair are stored the following two files and displayed in fig. 8.

[station ID].damcat_dam.[date-time]..data
[station ID].damcat_pair.[date-time]..data

The ".." in the file name above implies that there is an empty field. The field that normally occupies this location is known as the "Keys" field.

Files are stored in */awips/fxa/htdocs/cgi-bin/ohd/dambrkdocs/station/dam2data/data.*

The data in the file is concatenated and not easily readable. However, it may be possible to write a script to extract the data for local use.

6.2.5 *"Outputs"*

ADAMS LAKE AND DAM - AL00764 Dam Catalog Interface
Mode: *View Catalog Info* | View Dambreak Info | Edit Catalog Info
Table: Info | Inputs | Downstream Points | Cross Section Pairs | *Outputs*

Model Output

Source	Scenario	Point Number	Cross Section Type	Slope (ft/mi)	Max Flow (cfs)	Max Elevation (Depth) (ft MSL)	Time to Max Elevation (hr)
OHD	HF	0	P1	32.473	6427.055	107 (7ft)	0.004
OHD	HF	1	P1	32.473	1468.2	39 (4ft)	1
OHD	HN	0	P1	32.473	5964.629	107 (7ft)	0.04
OHD	HN	1	P1	32.473	1353.459	39 (4ft)	1.025
OHD	MF	0	P1	32.473	4279.14	106 (6ft)	0.003
OHD	MF	1	P1	32.473	789.167	38 (3ft)	1.204
OHD	MN	0	P1	32.473	3986.039	106 (6ft)	0.03
OHD	MN	1	P1	32.473	729.995	38 (3ft)	1.233

Fig 9. Display catalog Model Output   (Only part of Table is displayed)

When *"View Catalog Info"* and *"Outputs"* are selected the Model Output table displays information about model output, source, scenario, point number, and cross-section type. The number of combinations will vary depending on number of Sources, Scenarios, Number of Points, and number of Cross Section Types.

Outputs Table Information

Display Field	Units
Source	Originating Office.
Scenario	HF, HN, MF, or MN
Point Number	Sequential number for site below dam, where dam = 0
Cross Section type	Origin of cross section
Slope	Reservoir bottom slope, a ground that forms natural or artificial incline
Max Flow	Maximum flow at the location
Max Depth	Maximum depth at the location
Time to Max Depth	Time to reach flood depth.
Time to Below Flow	Time to fall below flood
Comments	
Updated	

Data Source & File Storage

When the "Table" toolbar category **Outputs** is selected, data from the INFORMIX tables damcat_dam and damcat_out are stored the following two files and displayed in fig. 8.

[station ID].damcat_dam.[date-time]..data
[station ID].damcat_out.[date-time]..data

The ".." in the file name above implies that there is an empty field. The field that normally occupies this location is known as the "Keys" field.

Files are stored in */awips/fxa/htdocs/cgi-bin/ohd/dambrkdocs/station/dam2data/data.*

The data in the file is concatenated and not easily readable. However, it may be possible to write a script to extract the data for local use.

6.3 View Dambreak Info

The View Dambreak Info section of the Users Guide describes how the user can view and interact with pre-existing Dambreak model data stored within the Dam Catalog (**Database**) as well as create new Dambreak Model data (**Run Simple Dambreak**) which can be saved to the Dam Catalog.

In either case, the Dambreak Model data may be saved, printed, issued as a test Product Message within house or officially transmitted on AWIPS to internal National Weather Service organizations or other governmental organizations.

The following discussion on Toolbar Modes will help the user understand the impact of the most important toolbar settings.

Toolbar Modes - (Affecting model data source and product issuance.)

Output Source

> **Database** - In this mode, only pre-existing Dambreak Runs are displayed for print, display and transmission.
>
> **Run Simple Dambreak** - In this mode, a new Dambreak Model can be executed with new results stored to the Dam Catalog for Display, print and transmission.

Display   *(Available only in Run Simple Dambreak Model)*
> Has two options: **Forecast** and **Raw Model Output**. **Forecast** runs the model and generates a Product Message. **Raw Model Output** displays the model run details in card format. *"Product Mode"* is not available in **Raw Model Output** In other words, the user cannot issue a message with the raw model output data.

Product Mode

> **Test** - Product Message is generated for in-house viewing only
>
> **Real** - Product is officially issued on AWIPS

Saving & Printing

> In order to print a copy of the message, whether in Test or Real mode, the Save button must be clicked first. The " Operation: **Print**" toolbar then appears. Click on **Print**, to get your copy on the local AWIPS printer.

Sending

> The RFCs have the send capability in addition to print. This appears in the Operation toolbar as: "Operation: **Print** **Send**"

6.3.1"*OHD, Hi Norm, P1, Database, Test*"

Fig 10. View Dambreak Info - Database, Test   (Only part of Table is displayed)

Window

The Initial Dam Catalog Interface window (Fig 10.) is labeled with a blue banner showing the name of the Dam and Dam's ID. Below the banner are two main toolbar sections labeled *"Mode"* and *"Current Parameters of Dambreak Run"*.   *"View Dambreak Info"* is highlighted since this window was selected.

Toolbars & Buttons - Saving & Printing

*"**Mode**" toolbar*:

> Shows hyperlink selections for
> **"View Catalog Info", *"View Dambreak Info"*, and "Edit Catalog Info".**

*"**Current Parameters of Dambreak Run**" toolbar section:*

> Contains several sub-toolbars which are self-explanatory:

> | Toolbars | Defaults |
> |---|---|
> | Model ran by: | *(Originating Office)* |
> | Scenario: | *Hi Norm* |
> | Cross Section Type: | *P1* |
> | Output Source: | *Database* |
> | **Product Mode:** | *Test* |

*"**Save**" Button:*   Click the *"Save"* button to save the displayed Product Message. A new window appears with the label "***Saved [date and time GMT]***"   The **Product Mode** Toolbar will be replaced with the Operation toolbar. The save and print operations are the same whether in Test or Real mode.

> WFOs only: "Operation: **Print**" toolbar. Click on **Print** to print the Product Message on AWIPS. See Figures 11, 12 and 13 for sample windows on save and print while in the Database & (Real or Test) modes.

> RFCs only: "Operation: **Print Send**" toolbar.

> The following three figures show examples of saving and printing.

> > Fig 11 - Shows Real Mode
> > Fig 12 - Shows Test Mode (Has "This is a Test" in the message body.)
> > Fig 13 - Shows Test Mode Print. Note banner indicating Print Succeeded.

Product Message

Category

The Product Message is displayed in a scrollable sub-window. It contains Output information from either the Database (Dambreak model forecast previously run and stored) or a Simple Dambreak Model Run based on current settings.

The Product Message should be issued under the Hydrometeorological Coordination Message (HCM) category.

> HYDROMETEOROLOGICAL COORDINATION MESSAGE
> NWS <RFC | WFO name> <RFC | WFO location>
> Time am/pm time_zone day mon dd yyyy
>
> < ** Dambreak Forecast **>
> <   Based on Dambreak Model Data issued by < RFC | WFO name >
> < ** Internal NWS Product - For Guidance Purposes Only ** >
>
> <   Name of Dam   >
> <   NIDID   >
>
> < Body of Product Message >
>
> $$

Body of Product Message

The body contains 4 sections of information including:

> **Time and Flood Wave Forecasts** *(Table of Downstream Forecast Points*)
> **Comments**
> **Inputs for This Forecast**
> **Dam Information**

Description of Product Message Sections

Time and Flood Wave Forecasts.   This section contains the following information for each Forecast Point. The first forecast point is at the Dam followed by the rest of the forecast points in consecutive order going downstream.

Display Field	Units
Forecast Point	Name of the Downstream Point
Distance from Dam	Miles downstream from dam
Time to Flood	Minutes to reach flood stage
Est Flood Stage	Feet for flood stage (above river bottom)
Time to Depth Peak	Minutes to reach peak
Peak Depth	Feet at peak stage (above river bottom)
Peak flow	CFS at peak flow.

Comments - ! ! ! This is only a Test ! ! !

Inputs for this Forecast: (1)

Display Field	Units
Source:	Originating Office (ALR, TAE etc.)
Scenario:	HF, HN, MF, MN
Starting Water Surface	Feet MSL
Bottom of Breach Width	Feet MSL
Starting Volume	Acre-ft
Starting Surface Area	Acre
Time to Failure	Minutes
Additional Flow to Add	CFS
Final Breach Width	Feet
Dam Type Code	

Dam Information: Contains the same information as displayed in **View Catalog Info** for the same dam.. The categories of information listed include: (2)

Dam
Offices
Construction
Regulatory

Notes:

(1) The list of inputs for this forecast is a subset of input list shown in **View Catalog Info** for the same dam.

(2) Some fields listed in the Dam Information Categories are not listed

Dambreak Model <u>Database </u>Fields

The database tables / fields required to display a dam break forecast in a Product Message, include:

Table		Database Field
damcat_dam	-	elev
damcat_down	-	elevation
damcat_down	-	flood_depth
damcat_down	-	distance_from_dam
damcat_out	-	max_depth
damcat_out	-	time_max_depth
damcat_out	-	max_flow
damcat_pair	-	elev

Data Source & File Storage

When the "Mode" toolbar hyperlink **View Dambreak Info** is selected or each time the save button is selected, Dambreak model data from the INFORMIX tables damcat_dam, damcat_in and damcat_down, and the time of the Dambreak run are stored in the several files and displayed in fig. 10. Note, with various sources, scenarios or cross section types, there may be many files.

> **[station ID].damcat_dam.[date-time]..data**
> **[station ID].damcat_in.[date-time]..data**
> **[station ID].damcat_down.[date-time]..data**
> **[station ID].[table_name].[date-time].keys.data**
>   ^---------   Keys: Reflect chosen source, scenarios
>   and cross section type.

The ".." in the file name above implies that there is an empty field. The field that normally occupies this location is known as the "Keys" field.

Files are stored in */awips/fxa/htdocs/cgi-bin/ohd/dambrkdocs/station/dam2data/data.*

The data in the file is concatenated and not easily readable. However, it may be possible to write a script to extract the data for local use.

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6.3.2 "*OHD, Hi Norm, P1, Database, Real* "

Fig 11. View Dambreak Info - Database, Real   (Only part of Table is displayed)

6.3.3 *"OHD, Hi Norm, P1, Database, Save"*

Mode: View Catalog Info | *View Dambreak Info* | Edit Catalog Info
Current Parameters of Dambreak Model Run

Model Ran by: *OHD*
Scenario: Hi Fast | *Hi Norm* | Mid Fast | Mid Norm
Cross Section Type: *P1*
Output Source: *Database* | Run Simple Dambreak Model
Operation: Print

Saved Thu Apr 03 18:36:50 GMT 2003.

```
SLCRUMSLR
OFFICE OF HYDROLOGICAL DEVELOPMENTtest
NATIONAL WEATHER SERVICE, SILVER SPRING, MARYLAND
1813 UTC Thu Apr 03, 2003

** INTERNAL NATIONAL WEATHER SERVICE PRODUCT FOR GUIDANCE PURPOSES ONLY **

FORECASTS BASED ON LATEST SIMPLIFIED DAMBREAK PROG ISSUED BY HRL



! ! ! ! ! ! !T H I S   I S   O N L Y   A   T E S T ! ! ! ! ! ! !

*** TAE HSA

. . . D A M   B R E A K   F O R E C A S T . . .


ADAMS LAKE AND DAM on TR LIMESTONE CREEK


Time and Flood Wave Forecast:
```

Forecast Point	Distance From Dam (mi)	Time to Flood (min)	Est Flood Stage (ft)	Time to Depth Peak (min)	Peak Depth (ft)	Peak Flow (cfs)
AT DAM	0.00	0	5	2	7	5965
SAINT WALDON CHURCH	2.00	60	5	61	4	1353

Save

Request time 17 seconds.

**Fig 12. View Dambreak Info - Database, Test, Save (Only part of Table is displayed)
"Save" button was clicked - Operation Print is now active.**

Data Source & File Storage

When the "Save" button is selected, Dambreak Forecast model data is stored in the forecast file.

[station ID].forecast

Files are stored in ***/awips/fxa/htdocs/cgi-bin/ohd/dambrkdocs/station/dam2break/data***.
Note: This directory location is different than that used by other toolbars. The data in the forecast file is concatenated and not easily readable. However, it may be possible to write a script to extract the data for local use.

The saved Product Message will now be displayed in a full Netscape window with scrollbars instead of the embedded window that was displayed previously. A label indicating **"Saved [date and time GMT]"** will appear on the saved Product Message.

6.3.4 *"OHD, Hi Norm, P1, Database, Print"*

ADAMS LAKE AND DAM - AL00764 Dam Catalog Interface

Mode: View Catalog Info | *View Dambreak Info* | Edit Catalog Info

Current Parameters of Dambreak Model Run

Model Ran by: *OHD*

Scenario: Hi Fast | *Hi Norm* | Mid Fast | Mid Norm

Cross Section Type: *P1*

Output Source: *Database* | Run Simple Dambreak Model

Operation: *Print*

Print Succeeded - Thu Apr 03 18:47:20 GMT 2003.

```
SLCRVMSLR
OFFICE OF HYDROLOGICAL DEVELOPMENTtest
NATIONAL WEATHER SERVICE, SILVER SPRING, MARYLAND
1813 UTC Thu Apr 03, 2003

** INTERNAL NATIONAL WEATHER SERVICE PRODUCT FOR GUIDANCE PURPOSES ONLY **

FORECASTS BASED ON LATEST SIMPLIFIED DAMBREAK PROG ISSUED BY HRL



! ! ! ! ! ! ! !T H I S   I S   O N L Y   A   T E S T ! ! ! ! ! ! ! !

*** TAE HSA

. . . D A M   B R E A K   F O R E C A S T . . .


ADAMS LAKE AND DAM on TR LIMESTONE CREEK


Time and Flood Wave Forecast:
```

Forecast Point	Distance From Dam (mi)	Time to Flood (min)	Est Flood Stage (ft)	Time to Depth Peak (min)	Peak Depth (ft)	Peak Flow (cfs)
AT DAM	0.00	0	5	2	7	5965
SAINT WALDON CHURCH	2.00	60	5	61	4	1353

Save

**Fig 13. View Dambreak Info - Database, Test, Print   (Only part of Table is displayed)
"Print" button was clicked.**

Data Source & File Storage

When the "Print" button is selected, the Product Message containing the Dambreak Forecast is printed on the local AWIPS printer with the label: **"Print Succeed [date] [time GMT]"**

If the print is successful the following files are created:

SLCRVMSLR.print.[date].[time].data.out
SLCRVMSLR.print.[date].[time].data.

These Files are stored in */awips/fxa/htdocs/cgi-bin/ohd/dambrkdocs/oper/product/data*.
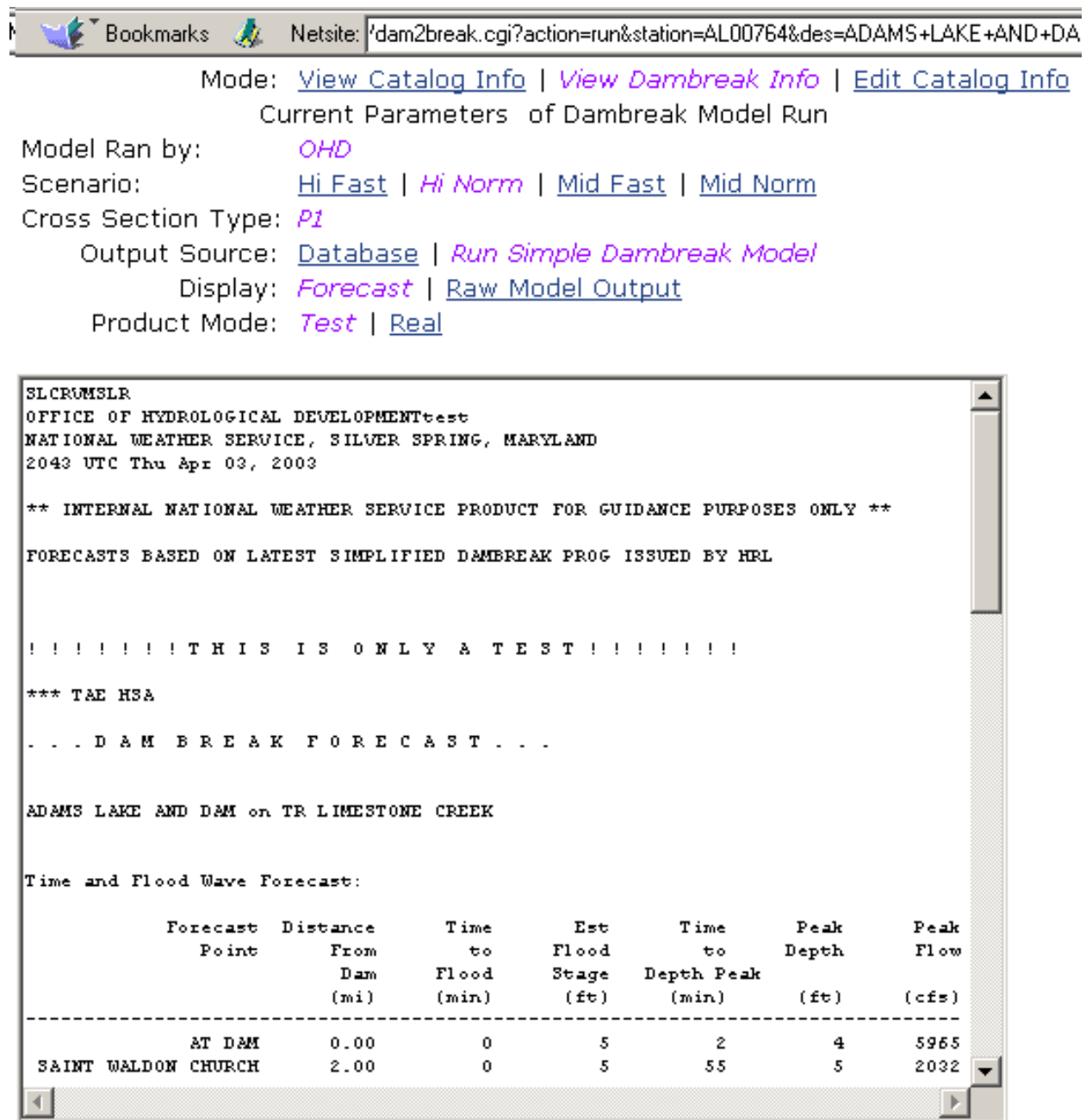
Notes:
The directory file storage location is different than that used by the other toolbar operations Depending on the PIL product category that will be used with the Dam Catalog and Dambreak Model Product messages, the file names above may vary. For example if HCM is adopted, the files would read:

SLCHCMSLR.print.[date].[time].data.out
SLCHCMSLR.print.[date].[time].data.

6.3.5 Run Simple Dambreak Model

6.3.5.1. "Forecast", "Test"

Fig 14. View Dambreak Info - Run Simple Dambreak Model, Forecast, Test
(Only part of Table is displayed)

"Output Source -> Run Simple Dambreak Model" was chosen under "Mode ->View.

6.3.5.2 *"Forecast", "Real"*

Fig 15. View Dambreak Info - Run Simple Dambreak Model, Forecast, Real
(Only part of Table is displayed)

"Output Source -> Run Simple Dambreak Model" was chosen under "Mode ->View.

Running the Simple Dambreak Model

Select the **Simple Dambreak Model** option in the "Output Source" toolbar. The type of output can either be a Forecast message or the raw model depending on the option selected in the "Display" toolbar.

The **Simple Dambreak Model**, **Forecast** option.
Creates a new set of dambreak model data, which can be printed, saved, and transmitted (ie Same capability as in the "**Database**" mode.)
Generates a Forecast Product Message in the same format displayed in the **"Database"** mode.

The **Simple Dambreak Model, Raw Model Output** option. Displays the model output in editable card format for the current model run.   Data in this display can be edited and the Dambreak model re-run and data saved as many times as desired.

Dambreak Model Fields required for running model

Table	Database Field	Description
damcat_dam		surface area
damcat_dam		river name
damcat_in	idam	type of dam
damcat_in	hde	starting water surface
damcat_in	bme	bottom of breach width
damcat_in	vol	starting volume
damcat_in	sa	starting surface area
damcat_in	bw	final breach width
damcat_in	tfm	time of failure
damcat_down	name	downstream point name
damcat_down		elevation
damcat_down		distance from dam
damcat_down		flood_depth
damcat_down	mann_oc	off channel manning
damcat_pair	tw	top width of the pair
damcat_pair	mann_n	mannings n coefficient for the pair
damcat_pair		inactive width

Data Source & File Storage

When the **Run Simple Dambreak Model** option is selected, the following files are created:

> **[station ID].input.data**   (the input file to model)
> **[station ID].output.data**   (the output file after model run)

These Files are stored in: ***/awips/fxa/htdocs/cgi-bin/ohd/dambrkdocs/station/oper/dam2model/data***.
Note, that the directory file storage location is different than that used by the other toolbar
operations.

6.3.5.3 *"Raw Model Output"*

ADAMS LAKE AND DAM - AL00764 Dam Catalog Interface

Mode: View Catalog Info | *View Dambreak Info* | Edit Catalog Info

Current Parameters of Dambreak Model Run

Model Ran by: *OHD*
Scenario: Hi Fast | *Hi Norm* | Mid Fast | Mid Norm
Cross Section Type: *P1*
Output Source: Database | *Run Simple Dambreak Model*
Display: Forecast | *Raw Model Output*

```
SIMPLIFIED DAMBREAK MODEL (SMPDBK) VERSION: 9/91
BY D.L. FREAD, J.M. LEWIS, & J.N. WETMORE - PHONE: (301) 427-7640
NWS HYDROLOGIC RESEARCH LAB W/OH3, 1325 EAST-WEST HIGHWAY,
SILVER SPRING, MD 20910


     C1       ADAMS LAKE AND DAM
     C2       TR LIMESTONE CREEK                             SAINT WALDON CHURCH
                   IBC       ISH        JNK      IDAM     IPLT     IREC
     C3           1         0          0        0        1        0
                   HDE       BME        VOL      SA       BW       TFM      QO
     C4          112.0    100.0       62.      9.6      48.0     2.4      295.
     C5       NS= 2      NCS= 4     CMS=.50      DISTTN= 2.00
              X-S NO.   1
     C6-1     D=    0.00      FLD=    5.00
     C7-1     HS=  100.00      BS=    388.     BSS=      0.      CM=0.090
     C7-2     HS=  105.00      BS=    406.     BSS=      0.      CM=0.090
     C7-3     HS=  104.00      BS=    402.     BSS=      0.      CM=0.090
     C7-4     HS=  112.00      BS=    430.     BSS=      0.      CM=0.090
              X-S NO.   2
     C6-2     D=    2.00      FLD=    5.00
     C7-1     HS=   35.05      BS=      0.     BSS=      0.      CM=0.090
     C7-2     HS=   40.05      BS=    278.     BSS=      0.      CM=0.090
     C7-3     HS=   39.05      BS=    248.     BSS=      0.      CM=0.090
     C7-4     HS=   47.05      BS=    430.     BSS=      0.      CM=0.090


***** DISTANCE TO PRIMARY POINT OF INTEREST MOVED TO THE CROSS SECTION
***** CLOSEST TO THIS LOCATION (MI   2.00)


THE DATA FOR THIS DAM IS AS FOLLOWS:

 TYPE OF DAM    (IDAM)           EARTH
```

Fig 16. View Dambreak Info - Run Simple Dambreak Model, <u>Raw</u> <u>Model</u> <u>Output</u>
(Only part of Table is displayed)

Select the **Raw Model Output** option in the "Display" toolbar. An editable text file showing the result of the model run is displayed. This data file is stored as **[station ID].output data.**

Output from Model - [station ID].output file description

C1 - output data line No.1:   DAMN
   DAMN - name of the dam

C2 - output data lone No.2:   RIVN, TOWN
   RIVN - name of the river
   TOWN - name of primary point of interest or town along the routing reach

C3 - output data line No.3:   IBC, ISH, JNK, IPLT, IREC
   IBC=0 - interactive input; IBC=1 - batch input
   ISH=0 - long version; ISH=1 - short version
   JNK=0 - minimum output; JNK=1 - max output for debugging
   IPLT=0 - no profile plots; IPLT=1 - profile plots
   IREC=0 - not avaiable; IREC>0 - record No. of dam in catalog to be updated

Note: in our version

IBC	ISH	JNK	IDAM	IPLT	IREC
1	0	0	0	1	0

C4 - output data line No.4:   IDAM, HDE, BME, VOL, SA, BW, TFM, QO
   IDAM=0 - earth dam; IDAM=1 - concrete gravity; IDAM=2 - concrete arch
   HDE - elevation (M.S.L.) of crest of dam or elevation of water when a dam breaches
   BME - final elevation (M.S.L) of breach bottom
   VOL - volume (acre-ft) of reservoir
   SA - surface area (acres) of reservoir at dam crest
   BW - width (ft) of rectangular breach
   TFM - time (minutes) for breach to develop
   QO - non-breach flow (spillway and overtopping) which occurs with maximum breach flow

C5 - output data line No.5:   NS, NCS, CMS, DISTTN
NS - number of cross-sections
   NCS - number of channel widths for each cross-section
   CMS - manning n - associated with off-channel storage
   DISTTN - distance to primary point of interest or town along the routing reach

C6 - output data line No.6:   D (I), FLD (I)
   D(I) - distance (miles) from dam to I-th cross-section (use 0.0 to denote tailwater (first) cross-section).
   FLD(I) - depth(ft) in cross-section at which flooding and
   DE - flooding times will be computed

C7 - output data line No.7:   HS (K, I), BS (K, I), CM (K, I)
    HS (K, I) - elevation (M.S.L) associated with K-th channel width (BS) of I -th cross-section,
    first elevation is the invert elevation
    BS (K, I) - K-th channel width (ft) of I-th cross-section
    BSS (K, I) - K - th inactive channel width (ft) of I-th cross-section
    CM (K, I) - K-th manning n, associated with K-th channel width of I-th cross-section.

Repeat data line No.7 for all NCS number of channel widths, then, repeat data lines No.6 and 7 for
NS number of cross-sections.

**** DISTANCE TO PRIMARY POINT OF INTEREST MOVED TO THE CROSS SECTION
**** CLOSEST TO THIS LOCATION (DISTTN in miles)

THE DATA FOR THIS DAM IS AS FOLLOWS:

TYPE OF DAM (IDAM=0 - earth dam; IDAM=1 - concrete gravity; IDAM=2 - concrete arch)
DAM BREACH ELEVATION   (HDE)   [Value]   (FT)
FINAL BREACH ELEVATION   (BME)   [Value]   (FT)
VOLUME OF RESERVOIR   (VOL)   [Value]   (ACRE-FT)
SURFACE AREA OF RESERVOIR (SA)   [Value]   (ACRES)   *
FINAL BREACH WIDTH   (BW)   [Value]   (FT)
TIME OF DAM FAILURE   (TFM)   [Value]   (MINUTES)
NON-BREACH FLOW   (QO)   [Value]   (CFS)
DISTANCE TO PRIMARY PT OF INTEREST (DISTTN)   [Value]   (MILES)
DEAD STORAGE EQUIV. MANN. N (CMS)   [Value]

[Next set of variables will be repeated CROSS SECTION NO. of times]

CROSS SECTION NO.   [Number of cross-section]
FLOOD DEPTH   (FLD)   [Value]   (FT)

ELEV. (HS)   [HS (K, I) - elevation (M.S.L) associated with K-th channel width (BS) of I -th cross
              section, first elevation is the invert elevation]   (FT)
TWIDTHS (BS)   [BS (K, I) - of K-th channel width of I -th cross section]   (FT)
INACTIVE TW (BSS) [BSS (K, I) - inactive channel width of I-th cross-section] (FT)
MANNING N (CM)   [K-th manning n, associated with K-th channel width of I-th cross-section]

[End of set of data for one CROSS SECTION]

AN ASTERISK (*) BESIDE A PARAMETER VALUE IMPLIES THAT A DEFAULT VALUE
WAS COMPUTED

NAME OF DAM: [Name of dam]   NAME OF RIVER: [Name of river]

Forecast at every point of interest:

Column No.1 -   RIVER MILE FROM DAM
Column No.2 -   MAX FLOW (CFS) - maximal flow
Column No.3 -   MAX ELEV (FT-MSL) - the elevation
Column No.4 -   MAX DEPTH (FT) - maximal depth
Column No.5 -   TIME MAX DEPTH (HR) - the time to the maximal depth
Column No.6 -   TIME FLOOD (HR) - the time to get to flood
Column No.7 -   TIME DEFLOOD (HR) - the time to fall below the flood level
Column No.8 -   FLOOD DEPTH (FT) - estimated flood stage

Re-running the Model

The Simple Dambreak Model can be rerun as many times as desired, by simply editing the entries displayed on screen and selecting the "Run" button. Each forecast run can be saved and/or printed.

Data Source & File Storage

The following set of the files are created with each forecast model run:
All sub-directories are reference: ***/awips/fxa/htdocs/cgi-bin/ohd/***

    [station ID].input
in the directory: ***../dambrkdocs/station/dam2break/data***;

    [station ID].[table].[date-time].keys.data - for every table in the database where keys - combination of source, scenario and xsec_type chosen for particular model run,

    [station ID].damcat_dam.[date-time]..data

    [station ID].damcat_in.[date-time]..data

    [station ID].damcat_down.[date-time]..data - with empty keys field,
all these files will be stored in the directory: ***../dambrkdocs/station/dam2data/data***;

    [station ID].input.data - with input to model data

    [station ID].output.data - with the result of the model run
in the directory ***../dambrkdocs/station/dam2model.***

6.4 Edit Catalog Info

The Edit Catalog Info section of the User's Guide describes how the user can edit select categories of Dam information within the Dam Catalog database. The categories available for editing are identical to the View Catalog Info mode and include:

Edit Table Toolbar Selection	GUI Screen Label
Info	Dam Information
Inputs	Input Data
Downstream Points	Downstream Points
Cross Section Pairs	Cross Section Pairs
Outputs	Output Data

"The Edit Catalog" mode has the same toolbar name, format and associations as the *"View Catalog"* mode except that the *"Table"* toolbar is renamed *"Edit Table"*. However not all of the fields listed in *"View Catalog"* mode are made available for editing in the *"Edit Catalog"* mode. For example only 10 of the 61 fields as listed in the "*Info*" table in *"View Catalog"* are presented for editing in the *"Info"* table displayed by *"Edit Catalog"*

The Scenario toolbar (Hi Fast, Hi Norm, Mid Fast, Mid Norm) is available with all the *"Edit Table"* toolbar selections except **Downstream Points** and **Cross Section Pairs**.

The *"Cross Section type"* is defaulted to P1 in all the *"Edit Table"* toolbar selections.

Saving Changes

Changes made to the Dam Catalog database may be saved by selecting the *"Save"* button. Each time any of the tables are saved, a new Date-Time GMZ will be inserted into the "updated" field in the database.

To finish editing of a particular table, the link **"Dam Catalog Interface"** located at the bottom of the screen must be selected.

Database & Files

The database tables and files generated for each table edit are identical except where highlighted in light blue.

6.4.1 *"Info", Scenario - Hi Fast*

Fig 17. Edit Catalog <u>Info</u> Table

Hyperlink "Mode -> Edit Catalog Info" is selected. "Edit Table -> Info" is default.

Info - Database & Files

Edits are saved to the **"damcat dam"** table in the Dam Catalog database.

The following set of the files are created (or updated) each time the database is edited and the model re-run. Depending on the number of sources, scenarios, and Dambreak runs there may be any number of files

All sub-directories are reference: ***/awips/fxa/htdocs/cgi-bin/ohd/***

    [station ID].input
                 in the directory: **../dambrkdocs/station/dam2break/data**;

    [station ID].[table].[date-time].keys/data
                         ^----------------------   Keys: Reflect chosen source, scenarios
                                            and cross section type.

    [station ID].[damcat_dam].date-time]..data
                 in the directory: **../dambrkdocs/station/dam2data/data**;

    [station ID].input.data - with input data to the model,

    [station ID].output.data - with the result of the model run
                 in the directory: **../dambrkdocs/station/dam2model**.

6.4.2 "_Inputs_", Scenario - Hi Norm

ADAMS LAKE AND DAM - AL00764 Dam Catalog Interface

Mode: <u>View Catalog Info</u> | <u>View Dambreak Info</u> | _Edit Catalog Info_
Edit Table: <u>Info</u> | _Inputs_ | <u>Downstream Points</u> | <u>Cross Section Pairs</u> | <u>Outputs</u>
Scenario: <u>Hi Fast</u> | _Hi Norm_ | <u>Mid Fast</u> | <u>Mid Norm</u>
Cross Section Type: _P1_

Input Data

Starting Water Surface (ft MSL)	112
Bottom of Breach Width (ft MSL)	100
Starting Volume (acre-ft)	62
Starting Surface Area (acre)	9.630465
Time of Failure (min)	2.4
Additional Flow to Add (cfs)	296
Final Breach Width (ft)	48
Dam Type Code	0
Comments	

Save

Fig 18. Edit <u>Inputs</u> Table

Hyperlinks "Mode -> Edit Catalog Info" and "Edit Table -> Inputs" are chosen.

Inputs - Database &Files

Edits are saved to the **"damcat in"** table in the Dam Catalog database.

The following set of the files are created (or updated) each time the database is edited and the model re-run. Depending on the number of sources, scenarios, and dambreak runs there may be any number of files

All sub-directories are reference: ***/awips/fxa/htdocs/cgi-bin/ohd/***

    [station ID].input
           in the directory: **../dambrkdocs/station/dam2break/data**;

    [station ID].[table].[date-time].keys/data
                    ^----------------------- Keys: Reflect chosen source, scenarios
                                        and cross section type.

    [station ID].[damcat_in].date-time]..data
           in the directory: **../dambrkdocs/station/dam2data/data**;

    [station ID].input.data - with input data to the model,

    [station ID].output.data - with the result of the model run
           in the directory: **../dambrkdocs/station/dam2model**.

6.4.3 *"Downstream Points"*

Fig 19. Edit Downstream Points Table

Hyperlink "Mode -> Edit Catalog Info" and "Edit Table -> Downstream Points" is selected.

Downstream Points - Database & Files

Edits are saved to the **"<mark>damcat down</mark>"** table in the Dam Catalog database.

The following sets of files are created (or updated) each time the database is edited and the model re-run. Depending on the number of sources, scenarios, and Dambreak runs there may be any number of files

All sub-directories are reference: ***/awips/fxa/htdocs/cgi-bin/ohd/***

    [station ID].input
                 in the directory: **../dambrkdocs/station/dam2break/data**;

    [station ID].[table].[date-time].keys/data
                    ^----------------------   Keys: Reflect chosen source, scenarios
                                               and cross section type.

    [station ID].<mark>[damcat_down]</mark>.date-time]..data
                 in the directory: **../dambrkdocs/station/dam2data/data**;

    [station ID].input.data - with input data to the model,

    [station ID].output.data - with the result of the model run
                 in the directory: **../dambrkdocs/station/dam2model**.

6.4.4. *"Cross Section Pairs"*

ADAMS LAKE AND DAM - AL00764 Dam Catalog Interface

Mode: View Catalog Info | View Dambreak Info | *Edit Catalog Info*
Edit Table: Info | Inputs | Downstream Points | *Cross Section Pairs* | Outputs
Cross Section Type: *P1*

Cross Section Pairs

Point Number [0]

Pair Number [0]

Elevation (ft MSL) [100]

Top Width (ft) [388.431]

Mannings N [0.09]

Inactive Width (ft) [0]

Point Number [0]

Pair Number [1]

Fig 20. Edit Cross Section Pairs Table

Hyperlink "Mode -> Edit Catalog Info" and "Edit Table -> Cross Section Pairs" is selected.

Cross Section Pairs - Database & Files

Edits are saved to the **"damcat pair"** table in the Dam Catalog database.

The following sets of files are created (or updated) each time the database is edited and the model re-run. Depending on the number of sources, scenarios, and dambreak runs there may be any number of files

All sub-directories are reference: ***/awips/fxa/htdocs/cgi-bin/ohd/***

    [station ID].input
               in the directory: **../dambrkdocs/station/dam2break/data**;

    [station ID].[table].[date-time].keys/data
                      ^----------------------   Keys: Reflect chosen source, scenarios
                                             and cross section type.

    [station ID].[damcat_pair].date-time]..data
               in the directory: **../dambrkdocs/station/dam2data/data**;

    [station ID].input.data - with input data to the model,

    [station ID].output.data - with the result of the model run
               in the directory: **../dambrkdocs/station/dam2model**.

6.4.5 *"Outputs"*

Fig 21. Edit Output Table

Hyperlink "Mode -> Edit Catalog Info" and "Edit Table -> Outputs" is selected.

Outputs - Database & Files

Edits are saved to the **"damcat out"** table in the Dam Catalog database.

The following sets of files are created (or updated) each time the database is edited and the model re-run. Depending on the number of sources, scenarios, and dambreak runs there may be any number of files

All sub-directories are reference: ***/awips/fxa/htdocs/cgi-bin/ohd/***

     [station ID].input
           in the directory: **../dambrkdocs/station/dam2break/data**;

     [station ID].[table].[date-time].keys/data
                 ^-----------------------   Keys: Reflect chosen source, scenarios
                                         and cross section type.

     [station ID].[damcat_out].date-time]..data
           in the directory: **../dambrkdocs/station/dam2data/data**;

     [station ID].input.data - with input data to the model,

     [station ID].output.data - with the result of the model run
           in the directory: **../dambrkdocs/station/dam2model**.

DamCat - User Notes

Dam2 Station List Search Tips

Problem: When you first enter this window, the program wants you to either accept the default "Dam" category, or select a category in "Search by" toolbar <u>first</u>, then enter text into the Search text box and then click on the search button. If you try to enter text data into the Search button input box first, then click on any of the categories in the "Search by" toolbar or for that matter the "Sort by" toolbar, the Search button input box is cleared out, and the screen returns with zero results.

Solution: Give it what it wants the first time through, after which the sort and search work normally.

Problem: If you select "Search by" and enter data that does not match the category in effect in the "Search by" toolbar, the search returns zero results. Every time you click on a category in the "Search by" or "Sort by" or hit return on a Search Input box entry, the search and sort operation runs on whatever is in the Search entry box according to the categories in effect.
This may sound like an obvious silly error, but is very easy to do.

Solution: Always mentally associate the "Search by" toolbar with the Search input box. Make sure that the type of data you want to search for matches the "Search By" category. The resulting list will automatically be sorted according to the category *highlighted* in the "Sort by" toolbar. You can continue to do different sorts on this same list by selecting different categories to sort on in the "Sort by" toolbar.

Appendix A. DamCat Menu Layout

There are three Main Menus in the Dam Catalog:

***Dam2 Station List*:**
Lists any number of Dams and some basic information. Allows user to select specific
Dam for viewing / editing, and for running Dambreak.

Name of Dam - ID
Interface Window for starting the DamCat Interface.

***DamCat Interface*:**
Displays all the available information on one selected Dam, and allows the user to edit data and
run the Dambreak model on the selected Dam.

The Main Menus have a variety of Sub-Menus and modes which display/or use various parameters
from the DamCat database.

> ***Level 1 = Dam2 Station List***
>
>> Dam2 Station List is used to Search, View, Sort and Output and display the
>> following:
>>> Fields:
>>>> Dam
>>>> River
>>>> County
>>>> **ID (NID ID)** - Selectable for Viewing and Edit
>>>> Other Name
>>>> HSA (Hydrologic Service Area)
>>>> RFC (River Forecast Center)
>>>> DH (Downstream Hazard)
>>>> Vol (Volume holding Capacity of Dam (CF))
>>>> Lat (DD.dddddd)
>>>> Lon (DD.dddddd)
>>
>>> Output Options:
>>>> Text
>>>> Comma Delimited
>>
>>> Selection Option:
>>>> From the list of Dams displayed by "Search" click on the **ID** Field to
>>>> Select that particular Dam for use by the Level 2 Simplified Dambreak
>>>> Mode.

Level 2 = Name of Dam - ID

Click on "**DamCat Interface**" to begin view, edit and run Dambreak on selected Dam.

Level 3 = DamCat Interface

DamCat Interface is used to View, Edit and save changes to the DamCat tables, and also to run the Simple Dambreak Model with modified input parameters.

Level 3a = "View Catalog" menu only has a Table tool bar. The Table toolbar displays DamCat tables according to selectable categories: {Info | Inputs | Downstream Points | Cross Sections | Outputs } The Info categories displays a list of data for all the scenarios.

Level 3b = "View Dambreak Info" has several toolbars including: Scenario, Cross Section Type, Output Source, Product Mode and Display. Which toolbars display depend on the combinations of mode selections within the toolbars. There are three main combinations described below:

Toolbar	*(Selections highlighted)*
	a. Database
3b1 = Scenario:	{ Hi Fast | Hi Norm | Mid Fast | Mid Norm }
3b2 = Cross Section Type:	{ P1}
3b3 = Output Source:	{ ***Database*** | Run Simple Dambreak Model }
3b4 = Product Mode:	**{** Test | Real **}**
	b. Run Simple Dambreak Model Forecast
3b1 = Scenario:	{ Hi Fast | Hi Norm | Mid Fast | Mid Norm }
3b2 = Cross Section Type**:**	{ P1}
3b3 = Output Source:	{ Database | ***Run Simple Dambreak Model*** }
3b5 = Display:	{ ***Forecast*** | Raw Model Output }
3b4 = Product Mode:	{ Test | Real }
	c. Run Simple Dambreak Model Raw Model Output
3b1 = Scenario:	{ Hi Fast | Hi Norm | Mid Fast | Mid Norm }
3b2 = Cross Section Type:	{ P1}
3b3 = Output Source:	{ Database | ***Run Simple Dambreak Model*** }
3b4 = Display:	**{** Forecast | ***Raw Model Output*** **}**

The View Catalog (3a) and View Dambreak Info (3b) menus are used to display a Simple Dambreak Model output message for the Scenario selected. The message can either be formatted for transmission on AWIPS or simply display the model output.   The message can be based on the existing Database or on the Forecast Dambreak Model output from a new Dambreak model run.

The messages formatted for AWIPS can either be kept in-house (Test) or officially issued (Real).

Various sample Dambreak Model output messages can be generated by editing the catalog tables and running the Simple Dambreak Model (3b) with various scenarios to obtain new results. (See Edit Catalog below.)   The last result saved, will replace the previously saved result for the selected scenario, and will be the result displayed for that scenario in the Database mode.

Level 3c = Edit Catalog Info menu has three tool bars: **Edit Table, Scenario, and Cross Section Type.**   The Scenario toolbar is only available when Info, Inputs or Outputs has been selected in the Edit Table toolbar. The Scenario Toolbar is not available when Downstream Points or Cross Sections are selected in the Edit Table toolbar.

Toolbar	*(Selections highlighted - Choose one)*
	*a. Info	Inputs	Outputs*
3c1 = Edit Table	{*Info	Inputs*	Downstream Points	Cross Sections	*Outputs* }
3c2 = Scenario	{ Hi Fast	Hi Norm	Mid Fast	Mid Norm }
3c3 = Cross Section type	{ P1 }
	*b. Downstream Points	Cross Sections*
3c1 = Edit Table	{Info	Inputs	*Downstream Points	Cross Sections*	Outputs }
3c3 = Cross Section type	{ P1 }

Summary on Output, Product, Netscape Print and Damcat GUI Print Modes:

Output - View and Edit Catalog Info: Creates a screen view summary of a few important DamCat fields.

> Text = Readable spreadsheet format.
> Delimited = Pipe delimited output fields suitable for importing to other programs.

Product Mode: - View Dambreak Info: Creates a screen view product message of Damcat Parameters.

> Test = Product Message is not issued. It includes a line indication that message is a TEST.
> Real = Product Message is officially transmitted as a real Dambreak Message on AWIPS.

Netscape Print - Print a postscript file of the screen without graphics.

Print GUI Button is available within the DamCat Menus.

Appendix B. DamCat Database Specifications

Database

DamCat uses the AWIPS Informix Relational Database Management System and is located in the Informix database as dc_ob2xxx, where xxx - the office identifier. For example, the DamCat database names are:

> dc_ob2tae - WFO Tallahassee Hydrologic Service Area
> dc_ob2pbz - Pittsburgh Basin RFC

Tables

The Relational structure for dc_ob2xxx is comprised of 6 tables:

Tables	Number of Fields	Tables	Number of Fields
damcat_in	13	damcat_dam	61
damcat_down	15	damcat_elev	6
damcat_pair	11	damcat_out	13

These tables contains information on dam physical data, down stream location and cross-section data, dam break results at dam and downstream locations, and reservoir capacity. New sites can be added adding the appropriate data to these tables using the Edit Catalog Window available in the DamCat program..

The DamCat Table and field listings contain the following columns of information:

colname   = Field name used in the DamCat database.
colno   = The column number of the field
coltype   = The data type applicable to the corresponding field.
collength = column length of the corresponding field

For those interested in the technical details, the column definitions (colname, colno, coltype, collength) and information on Data Types are given in the Informix Guide to SQL Reference Feb 1998.

To look at the table structure (Schema) of the DamCat database within Informix, execute the following SQL command using dbaccess. Be sure that you have selected the DamCat Database for your office, e.g., db_ob2xxx, where xxx - the site office identifier.

"SELECT tabname, tabid FROM systables where tabid > 99"

Note: You can use the same command for any database within Informix to obtain a Table listing.
Note: Nulls are viewable within dbaccess Table Info selection.

Yes - means the field does not have to be filled in.
No - means the field must not be empty. May imply that this is a key index field.

DamCat Tables & Fields:

damcat_in				
colname	*colno*	*coltype*	*collength*	*Nulls*
nidid	1	Char	10	No
src	2	Char	3	No
scenario	3	Char	2	No
hde	4	Float	8	
bme	5	Float	8	
vol	6	Float	8	
sa	7	Float	8	
tfm	8	Float	8	
qo	9	Float	8	
bw	10	Float	8	
idam	11	Integer	4	
comments	12	Char	30	
updated	13	Datetime	date/time	

damcat_down				
colname	*colno*	*coltype*	*collength*	*nulls*
nidid	1	Char	10	No
src	2	Char	3	No
down_num	3	Integer	4	No
xsec_type	4	Char	2	No
name	5	Char	25	
longitude	6	Float	8	
latitiude	7	Float	8	
elevation	8	Float	8	
distance_from_dam	9	Float	8	
flood_flow	10	Float	8	
flood_depth	11	Float	8	
flood_width	12	Float	8	
mann_oc	13	Float	8	
comments	14	Char	30	
updated	15	Datetime	date/time	

damcat_pair				
colname	*colno*	*coltype*	*collength*	*nulls*
nidid	1	Char	10	No
src	2	Char	3	No
down_num	3	Integer	4	No
xsec_type	4	Char	2	No
name	5	Char	25	
longitude	6	Float	8	
latitiude	7	Float	8	
elevation	8	Float	8	
distance_from_dam	9	Float	8	
flood_flow	10	Float	8	
updated	11	Datetime	date/time	

damcat_dam				
colname	*colno*	*coltype*	*collength*	*nulls*
nidid	1	Char	10	No
dam_name	2	Char	65	
other_dam_name	3	Char	65	
dam_former_name	4	Char	50	
stateid	5	Char	20	
section_t_r	6	Char	30	
county	7	Char	30	
river	8	Char	30	
owner_name	9	Char	50	
owner_type	10	Char	14	
dam_designer	11	Char	65	
private_on_federal	12	Char	6	
dam_type	13	Char	6	
core	14	Char	6	
foundation	15	Char	6	
purposes	16	Char	8	
year_completed	17	Char	20	
year_modified	18	Char	20	
downstream_hazard	19	Char	11	
emerg_action_plan	20	Char	3	
inspection_date	21	Char	20	
inspection_freq	22	Char	20	
st_reg_dam	23	char	6	
st_reg_agency	24	Char	30	
spillway_type	25	Char	6	
spillway_width	26	Float	8	

outlet_gates	27	Char	6	
volume_dam	28	Float	8	
number_locks	29	Float	8	
length_locks	30	Float	8	
width_locks	31	Float	8	
fed_funding	32	Char	20	
fed_design	33	Char	20	
fed_construction	34	Char	20	
fed_regulatory	35	Char	20	
fed_inspection	36	Char	20	
fed_operation	37	Char	20	
fed_owner	38	Char	20	
fed_other	39	Char	20	
source_agency	40	Char	60	
drainage_area	41	Float	8	
topo_map	42	Char	22	
hsa	43	Char	3	
rfc	44	Char	5	
return_flow_region	45	Integer	4	
longitude_dam	46	Float	8	
latitude_dam	47	Float	8	
dam_length	48	Float	8	
dam_height	49	Float	8	
structural_height	50	Float	8	
hydraulic_height	51	Float	8	
nid_height	52	Float	8	
max_discharge	53	Float	8	
max_storage	54	Float	8	

normal_storage	55	Float	8	
nid_storage	56	Float	8	
surface_area	57	Float	8	
elev	58	Float	8	
prebreak_avail	59	Char	1	
comments	60	Char	30	
updated	61	Datetime	date/time	

damcat_elev				
colname	colno	coltype	collength	nulls
nidid	1	Char	10	No
type	2	Char	1	No
elevation	3	Float	8	No
stordis	4	Float	8	
surface	5	Float	8	
updated	6	Datetime	date/time	

damcat_out				
colname	*colno*	*coltype*	*collength*	*nulls*
nidid	1	Char	10	No
src	2	Char	3	No
scenario	3	Char	2	No
down_num	4	Integer	4	No
xsec_type	5	Char	2	No
slope	6	Float	8	
max_flow	7	Float	8	
max_depth	8	Float	8	
time_max_depth	9	Float	8	
time_flood	10	Float	8	
time_deflood	11	Float	8	
comments	12	Char	30	
updated	13	Datetime	date/time	

Appendix C. Database Maintenance

Ownership of tables are constrained to the user ID of oper. Any changes, updates, deletions to the tables must be done as oper on DS1.

Scripts & Files

After OB2 is complete, Database SQL scripts and unload files (*.unl) are located on DS1 in the damcat directory: */awips/hydroapps/ihfsdb_conversion*

The scripts provided with OB2 are located in the above directory and include:

> delete_damcat_data   ----->   Used to delete the entire database
> load_damcat_data   ----->   Used to upload an unload file (*.unl) into the
> > DamCat database. The unload file should
> > contain all dams belonging to your HSA and
> > surrounding HSA's your office backs up.

Additionally, the DamCat database can be viewed and/or modified with SQL scripts using dbaccess or Snoopy software interfaces. This should only be done by properly trained staff in coordination with the Office of Hydrology.

Deleting the Database

To delete the entire database execute the **delete_damcat_data** script. No command line arguments are needed for **delete_damcat_data.**

Loading the Database

The "**load_damcat_data   xxx**" script will upload all DamCat table unload files having the extension **"xxx"**. The convention is to set **"xxx"** to the local office identifier, but this is not required. The script only looks for unload files with the extension "**xxx**". For example, **"xxx"** could be set to **"unl"** or **"dat".**   Whatever the script finds, it will store in the local DamCat database. This is handy if you need to load a neighboring office DamCat database for backup operations.

To load the data from the unload files into the local DamCat database, execute the following command: **load_damcat_data   xxx**

Process for adding new Dams to the Database

Overview

The best approach is to create an unload file for each table in the DamCat database, then add the new Dam parameters to the appropriate unload files using your favorite editor. With the new unload files created, the next step would be to delete your DamCat database using **delete_damcat_data** script. Then create the new database with the new Dam data using the **load_damcat_data** script
Before proceeding it would be a good idea to review the latest Download and Installation instructions available on the WHFS Field Support Group Web page.

Details

1. The following unload files need to be created from the corresponding DamCat tables.
   xxx = the local office identifier (Matches the identifier in the DamCat database name)

damcat_in.xxx	**damcat_dam.xxx**
damcat_down.xxx	**damcat_elev.xxx**
damcat_pair.xxx	**damcat_out.xxx**

   Since it would not be practical to use the Dam Catalog Interface to dump one dam at a time to a pipe delimited file, the best approach is to use an SQL command in dbaccess or Snoopy.

   The SQL command to do this is:

   > UNLOAD TO '**damcat_in.xxx**'
   > SELECT * from **damcat_in**

   Do this for each table, substituting the appropriate table name each time.
   The 6 unload files of all the tables are created using the naming convention shown above.
   Be sure that these files are stored in same directory as the **load_damcat_data** script.

2. Edit each ".xxx" unload file to add the new Dam data

3. Delete the old DamCat database by running:
   delete_damcat_data

4. Upload the 6 modified unload files into the DamCat database by running:
   load_damcat_data xxx

5. All Done. Using the DamCat interface, check to make sure everything worked.

6. Contact <u>OH</u> if there are problems.

Appendix D. DamCat Cross - Reference Tables

Field names & definitions are listed alphabetically in the table below. The definitions were obtained from the DAMCAT Users Guide, the National DamCat Field Definitions and the Simple Dam Break Model documentation. The GUI Menu Level & Mode Selections section below also describe the DamCat Menu layout.

DamCat Field Names: The actual Informix field names used by DamCat.

Definitions: Corresponding definitions of the field names as used by DAMCAT program.

GUI Field Names: Corresponding clickable Menu names as displayed in the various DAMCAT Menus.

GUI Menu Level & Mode Selections: The Menus in DamCat consist of several nested GUI levels with different Mode Selections. This column shows what Fields are used at various Menu levels and how to proceed to various levels when running DamCat.

SMPDBRK OUTPUT Names: The corresponding names used in the Simple Dambreak Raw Output mode.

The following table cross references Field Names and Definitions used in the DamCat Database, the Dam Break Program and the National Inventory of Dams (NID) Data Dictionary. The information contained within this table also corresponds to the DamCat Field Definitions listed in the DamCat Dictionary at the WHFS Field Support Group web page.

The Current DamCat Field names are highlighted in bold. The old DamCat Field names are not-highlighted. *The NID Data Dictionary field names and definitions are in italics.* Whenever definitions match closely, only one copy of the definition is presented.

For example: The **highlighted field name** is the currently used name in the new DamCat.
The non-highlighted Field name is the name used in the old DamCat.
The italized Field Name is the name used by the NID Data Dictionary and is indented 5 spaces.
other_dam_name   **New DamCat**
Other Dam Names   Old DamCat
     OTHER_NAME   NATIONAL INVENTORY OF DAMS DATA DICTIONARY

Also there is a column that cross references the GUI Naming convention for each field. In other words, you can cross reference the GUI name listed for a field in the DamCat interface with the names used in the NID Data Dictionary, the DamCat Informix Database and the old version of DamCat. Hopefully this will simplify the management of the DamCat database.

DamCat Field Names & Definitions

Damcat Field Names Old Damcat Names NID FIELD NAMES	Definitions NID Database Definitions 95-96 (Field Width)	GUI Field Names	GUI Menu Layout Number	SMPDBRK OUTPUT Names	Units
bme	Bottom of Breach Width. Final elevation (MSL) of breach bottom.			FINAL BREACH ELEVATION	FT
bw	Final Breach Width of rectangular breach.			FINAL BREACH WIDTH	FT
comments	Comments	**Comments**	3a		
----- CONG_DIST	----- The 104th Congressional District in which the dam is located (example, KS-02). A calculated field based on LONGITUDE_X and LATITUDE_Y, using as a source the MapInfo Corporation 104th Congressional District Boundaries dataset. (A5)				

DamCat Field Names & Definitions					

core	Type of Core inside the Dam.
	
	Code indicates the position and type of watertight members -
	
	    A=bituminous Concrete,
	    C=Concrete,
	    E=Earth,
	    F=upstream Facing,
	                 H=Homogeneous dam,
	    I=Core,
	    K=Known certainty,
	    M=Metal,
	    P=Plastic,
	    X=Unlisted,
	    Z=Estimated.
		Construction - Core	3a		

county County COUNTY	County Dam is located in. Name of county in which the dam is located. (A30)	**County** **Dam - County**	1 3a		
dam_designer					
dam_former_name	Former Name of the Dam.	**Dam - Former Name**	3a		

DamCat Field Names & Definitions

dam_height Dam Height DAM_HEIGHT	Height of Dam Dam height in feet. It is defined as the vertical distance between the lowest point on the crest of the dam and the lowest point in the original streambed. (Numeric) Because the "height" of dam definition used by each of the participating state and federal agencies varies, three different height fields are provided in the national database. Each agency has been requested to enter values for the height field item(s) that most closely correspond to the height of the dam definition(s) used by the agency. Dam Heights that do not correspond to agency data may be left blank. To facilitate database queries, a single height value has been calculated for each dam based on the information transmitted for this field. See item NID HEIGHT.	Construction - Dam Height	3a		FT

DamCat Field Names & Definitions

dam_length *Dam Length* *DAM_LENGTH*	*Width of Dam* *Dam length in feet. It is defined as the length along the top of the dam. Included in dam length are spillway, power plant, navigation lock, fish pass, etc., if these form part of the length of the dam; if detached from the dam, these structures are not included. (Numeric)*	**Construction – Dam Length**	*3a*		*FT*
dam_name *DAM NAME* *DAM_NAME*	*Name of the Dam.* *Official name of the dam. For dams that do not have an official name, the popular name is used. (A65)*	**Dam** **Dam – Dam Name**	*1* *3a*		

DamCat Field Names & Definitions

dam_type
Dam Type
 	
    DAM_TYPE
	Type of Dam
	
	Code indicating the type of dam. Codes used are as follows -
	
	    RE = Earth;
	    ER = Rockfill;
	    PG = Gravity;
	    CB = Buttress;
	    VA = Arch;
	    MV = Multi-Arch;
	    CN = Concrete;
	    MS = Masonry;
	    ST = Stone;
	    TC= Timber Crib;
	    OT = Other.
	
	Codes are concatenated if the dam is a combination of several types. (See also NID DAM TYPE below) (A8)
		Construction - Dam Type	3a		

NID_DAMTYP	Term indicating dam type as one of the following -
	
	    Arch,
	    Buttress,
	    Gravity.
	
	A calculated field, based on the codes provided in field item DAM TYPE, using the following precedence:
	
	    (VA or MV) = Arch;
	                B = Buttress;				

DamCat Field Names & Definitions

distance_from_dam *Distance Nearest City* *DIST_CITY*	*Distance from the dam to the nearest downstream affected City-Town-Village, to the nearest mile. (See NEAR CITY) (Numeric)*		*3a*		
down_num	*The relative order of the forecast point from the dam, dam = 0. Subsequent sites are numbered 1,2,3 etc.*		*3a*		
downstream_hazard *Downstream Hazard* *HAZARD*	*Code indicating the potential hazard to the downstream area resulting from failure or mis-operation of the dam:* *L = Low (No damage)* *S = Significant (Property)* *H = High (Life/Limb & Property)* *Term indicating the potential hazard to the downstream area resulting from failure or mis-operation of the dam or facilities. Terms used are as follows: Low, Significant, High. (A11)*	**DH**	*1*		
drainage_area *Drainage Area* *DRAIN_AREA*	*Drainage area of the dam in square miles. It is defined as the area that drains to a particular point (in this case, the dam) on a river or stream. (Numeric)*	**Dam - Drainage Area**	*3a*		*MI2*

DamCat Field Names & Definitions					
elev	*Elevation (MSL) associated with cross sections.*			*ELEV [HS(K,I) – elevation (MSL) associated with K-th channel width (BS) of I-th cross section. First elevation is the invert elevation.*	*FT*
elevation	*Dam Elevation*	**Dam - Elevation**	*3a*		*FT*

DamCat Field Names & Definitions

emerg_action_plan *Emergency Action Plan*	*Code indicating whether this dam has an Emergency Action Plan (EAP), which is defined as a plan of actions to reduce the potential for property damage and loss of life in an area affected by a dam failure or large flood, Y=Yes, N=No, NR=Not Required.*		*3a*	
EAP	*Term indicating whether this dam has an Emergency Action Plan (EAP), which is defined as a plan of action to be taken to reduce the potential for property damage and loss of life in an area affected by a dam failure or large flood. Terms used are as follows: Yes; No; N/R. (N/R = Not required by submitting agency. For name of submitting agency, see Source Agency) (A3)*			

DamCat Field Names & Definitions

```
-----                    -----

    FED_AGCY            Code identifying federal agency
                        involvement in the dam. Codes are
                        concatenated if several agencies
                        were involved.  See fed field items
                        below and the related Federal Agency
                        Code Table for specific types of
                        involvement and for a description of
                        the agency codes used.  (A20)

                            FEDERAL AGENCY CODE TABLE
                        ===================================
                        Fed Agency Name   Fed Agency Code
                        -------------------------------

                        Department of Agriculture

                        Natural Resources Conservation Serv
                                                  (USDA NRCS)
                        - formerly Soil Conservation Serv
                                                  (SCS)

                        Forest Service          (USDA FS)

                        Rural Housing Service    (USDA RHS)
                             - formerly Farmers Home Loan

                        Department of Defense
                        U.S. Army Corp of Engineers   (CE)
                        U.S. Army              (DOD USA)
                        U.S. Navy              (DOD USN)
                        U.S. Air Force         (DOD USAF)
```

DamCat Field Names & Definitions

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FED_AGCY #Continued	Department of Interior Bureau of Reclamation (DOI BR) Bureau of Indian Affairs (DOI BIA) Bureau of Land Management (DOI BLM) Fish & Wildlife Service (DOI FWS) Geological Survey (DOI GS) National Park Service (DOI NPS) Department of Labor Mine Safety& Health Admin (DOL MSHA) Department of State Intl Boundary & Water Comm (IBWC) Department of Energy (DOE) Federal Energy Regulatory Comm (DOE FERC) Nuclear Regulatory Commission (US NRC) Tennessee Valley Authority (TVA)				

DamCat Field Names & Definitions

fed_construction Fed Agency Inv Construct FD_CONSTRC	Code identifying which federal agency was involved in the construction of the dam; codes are concatenated if several agencies were involved. (A20) (Field data item specific to federal agency transmittal)		3a		
fed_design Fed Agency Inv Design FD_DESIGN	Code identifying which federal agency was involved in the design of the dam; codes are concatenated if several agencies were involved (A20) (Field data item specific to federal agency transmittal)		3a		
fed_funding Fed Agency Inv Funding FD_FUNDING	Code identifying which federal agency was involved in the design of the dam; codes are concatenated if several agencies were involved. (A20) (Field data item specific to federal agency transmittal)		3a		

DamCat Field Names & Definitions					
fed_inspection *Fed Agency Inv* *Inspection* *FD_INSPECT*	*Code identifying which federal* *agency is involved in the inspection* *of the dam. Codes are concatenated* *if several agencies are* *involved. (A20)* *(Field data item specific to federal* *agency transmittal)*		*3a*		
fed_operation *Fed Agency Inv* *Operation* *FD_OPERATE*	*Code identifying which federal* *agency is involved in the operation* *of the dam; codes are concatenated* *if several agencies were involved.* *(A20)* *(Field data item specific to federal* *agency transmittal)*		*3a*		
fed_other *Fed Agency Inv* *Other* *FD_OTHER*	*Code identifying which federal* *agency is involved in other aspects* *of the dam. Codes are concatenated* *if several owners are involved.* *(A20)* *(Field data item specific to federal* *agency transmittal)*		*3a*		

DamCat Field Names & Definitions

fed_owner *Fed Agency Inv Owner* *FD_OWNER*	*Code identifying which federal agency partly or wholly owns the dam. Codes are concatenated if several owners are involved. (A20)* *(Field data item specific to federal agency transmittal)*		*3a*		
fed_regulatory *Fed Agency Inv Regulatory* *FD_REGULAT*	*Code identifying which federal agency is involved in the regulation of the dam. Codes are concatenated if several agencies were involved. (A20)* *(Field data item specific to federal agency transmittal)*		*3a*		
----- *FIPS_STATE*	*-----* *The FIPS (Federal Information Processing Standard) code used by the U.S. Bureau of Census for the state in which the dam is located. A calculated field based on field NID ID, using as a source the MapInfo Corporation STATE dataset. (A2)*				

DamCat Field Names & Definitions

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FIPS_CNTY	*The FIPS (Federal Information Processing Standard) code used by the U.S. Bureau of Census for the county in which the dam is located. A calculated field, based on field items NID ID, COUNTY, LONGITUDE_X, and LATITUDE_Y, using as a source the MapInfo Corporation High resolution County Boundaries dataset (CNTYHR). (A6)*				
flood_depth	*Estimated flood stage. Depth in cross-sections at which flooding occurs.*		*3a*	*FLD(I)*	*FT*
flood_flow	*The estimated river flow at flood stage.*		*3a*		
flood_width	*The estimated width of a channel cross section at flood stage.*		*3a*		
foundation	*Type of foundation supporting the Dam. Code for material on which the dam is constructed – R=Rock, S=Soil, U, Z=unlisted, K=known*	*Construction – Foundation*	*3a*		
hde	*Starting water surface. Elevation (MSL) of crest of dam or elevation of water when a dam breaches.*		*3a*	*DAM BREACH ELEVATION*	*FT*

DamCat Field Names & Definitions

hsa	*Hydrologic Service Area*	*HSA* *Offices - HSA*	*1* *3a*		*TAE,* *etc.*
hydraulic_height *Hydraulic Height* *HYDR_HGT*	*Depth of Water in Dam.* *Hydraulic height of the dam in feet. It is defined as the vertical difference between the maximum designed water level and the lowest point in the original streambed. (Numeric)* *Because the "height" of dam definition used by each of the participating state and federal agencies varies, three different height fields are provided in the national database. Each agency is requested to enter values for the height field item(s) that most closely correspond to the height of the dam definition(s) used by the agency. Hydraulic Heights that do not correspond to agency data may be left blank. To facilitate database queries, a single height value has been calculated for each dam based on the information transmitted for this field. See item NID HEIGHT.*	*Construction -* *Hydraulic Height*	*3a*		*FT*

idam	*Type of Dam*
	  0 = earth dam
	  1 = concrete Gravity
	  2 = concrete arch
			3a	*TYPE OF DAM*	

DamCat Field Names & Definitions

inactive_width	Inactive Channel Width		3a	INACTIVE TW [BSS(K,I)- INACTIVE CHANNEL WIDTH OF I-th cross sectional	FT

inspection_date
 	
Last Inspection Date
    INSP_DATE
 	
Phase I Inspection
    PHASEI_INS
	Date of the most recent inspection of the dam (MM/DD/YY).
	
	Date of the most recent inspection of the dam (MM/DD/YY) prior to the transmittal of the data by the submitting agency.
	
	Term indicating whether this dam was inspected in the Phase I Inspection Program, National Program of Inspection of Non-Federal Dams (P.L. 92-367).
	Terms used are: Yes, No. (A3)
	Not used in DAMCAT.
			3a		

inspection_freq	How often the dam should be inspected.		3a		
latitiude	West latitude of the downstream point		1 3a		

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DamCat Field Names & Definitions

latitude_dam *Latitude* *Latitude DEG* *Latitude MIN* *Latitude SEC* *LATITUDE_Y*	*North Latitude of the Dam.* *Dam latitude as a single value, in decimal degrees (Deg + Min/60 + Sec/3600). Y-coordinate for geocoding. (Numeric)*	***Lat*** ***Dam - Latitude***	*1* *3a*		
length_locks *Length of Locks* *LOCK_LEN*	*Length of the primary navigation lock.* *Length of the primary navigation lock in feet. (Numeric)* *(Field data item specific to federal agency transmittal)*		*1* *3a*		*FT*
longitude	*West Longitude of the downstream point.*		*1* *3a*		
longitude_dam *Longitude* *Longitude DEG* *Longitude MIN* *Longitude SEC* *LONGITUDE_X*	*West Longitude of the Dam.* *Dam longitude as a single value, in decimal degrees (Deg + Min/60 + Sec/3600)*(-1). *X-coordinate for geocoding. (Numeric)*	***Lon*** ***Dam - Longitude***	*1* *3a*		

DamCat Field Names & Definitions						
mann_n	*Mannings n coefficient for the pair at the given elevation.*			*3a*	*CM – MANNING N* *K-th manning n, associated with K-th channel width of I-th cross section.*	
mann_oc	*The estimated off channel manning's n at the forecast point.*			*3a*	*Dead storage equiv MANN N [CMS]*	
max_depth	*Max depth at the forecast point.*			*3a*		*FT*
max_discharge *Maximum Discharge* *MAX_DISCH*	*Maximum Discharge of the Dam.* *Number of cubic feet per second (cu ft/sec) which the spillway is capable of discharging when the reservoir is at its maximum designed water surface elevation. (Numeric)*	**Construction – Max Discharge**		*3a*		*CFS*
max_flow	*Max flow at the forecast point.*			*3a*		*CFS*
max_storage *Maximum Storage* *MAX_STOR*	*Maximum Storage of Dam.* *Maximum storage in acre-feet. It is defined as the total storage space in a reservoir below the maximum attainable water surface elevation, including any surcharge storage. (See NID STORAGE) (Numeric)*	**Construction – Max Storage**		*3a*		*Acre-FT*

DamCat Field Names & Definitions

name *Nearest City-Town* *NEAR_CITY*	*Name of the nearest downstream city, town, or village that is most likely to be affected by floods resulting from the failure of the dam. (A30)*		*3a*		
nid_height *NID Height* *NID_HEIGHT*	*Height of Dam in National Inventory of Dams.* *A calculated field based on the maximum value of field items DAM HEIGHT, HYDRAULIC HEIGHT, and STRUCTURAL HEIGHT, providing a single height value to facilitate database queries. (Numeric)*	**Construction –** **NID Height**	*3a*		*FT*
nid_storage *NID_STORAGE*	*Storage of Dam in National Inventory of Dams.* *A calculated field based on the maximum value of field items NORMAL STORAGE, and MAXIMUM STORAGE providing a single storage value to facilitate database queries. (Numeric)*	**Construction –** **NID Storage**	*3a*		*Acre-FT*

DamCat Field Names & Definitions

nidid *National ID* *NID_ID*	*National Inventory of Dams Identification Number.* *The official National Inventory of Dams identification number for the dam, known formerly as the National Id. This is a required field, and must have an entry for each dam included in the National Inventory of Dams. This field is used as the unique identifier for each dam record. The first two characters of the identity are the state two letter abbreviation, based on the location of the dam. The last five characters of the identity are a unique number (AB#####).*	**ID** **Dam - NID ID**	*1,2* *3a*		
normal_storage *Normal Storage* *NORM_STOR*	*Normal Storage of Dam* *Normal storage in acre-feet. It is defined as the total storage space in a reservoir below the normal retention level, including dead and inactive storage and excluding any flood control surcharge storage. (See also NID STORAGE). (Numeric)*	**Construction -** **Normal Storage**	*3a*		*Acre - FT*

DamCat Field Names & Definitions

number_locks *Number of Locks* *NUM_LOCKS*	*Number of existing navigation locks for the project. Maximum of 4. (Numeric)* *(Field data item specific to federal agency transmittal)*				
other_dam_name *Other Dam Names* *OTHER_NAME*	*Alternative name of Dam.* *Reservoir name or names in common use other than the official name of the dam. Names are separated with semi-colons. (A65)*	**Other Name** **Dam - Other Dam Name**	*1* *3a*		

outlet_gates	*Code describing the type of spillway or outlet gates –*
	
	  TR = Tainter,
	  L = vertical Lift,
	  R = Roller,
	  B = bascule,
	  D = Drum,
	  N = needle,
	  F = flap,
	  S = Slide,
	  V = Valve,
	  O = Other,
	  U = Uncontrolled,
	  X = None
			3a		

owner_name *Owner Name* *OWNER*	*Name of the owner of the dam. (A50)*		*3a*		

DamCat Field Names & Definitions

owner_type
Owner Type
 	
OWN_TYPE
	Code indicating owner type -
	
	   F = Federal,
	   S = State,
	   L = Local Government,
	   U = Public Utility,
	   P = Private.
	
	Term indicating owner type. Terms used are as follows -
	   Federal,
	   State,
	   Local Gov't,
	   Public Utility,
	   Private.
			3a		

pair_num	An indicator of elev/top width pair, lowest = 0.		3a		
prebreak_avail	Checks if a prebreak is available in the office (RFC specific).	**Dam - Prebreak Available**	3a		
private_on_federal NonFed DAM on Fed Prop NONFED_DAM	Term indicating whether the dam is a non-federal dam located on federal property. Terms used are: Yes, No. (A3)				

DamCat Field Names & Definitions

purposes
Purpose
    PURPOSE
	Codes indicating the purposes for which the reservoir is used. Codes used are as follows –
	
	    I = Irrigation;
	    H = Hydroelectric;
	    *C = Flood Control And Storm
	                        Water
	Management;*
	    N = Navigation;
	    S = Water Supply;
	    R = Recreation;
	    *P = Fire Protection, Stock, or
	                Small Farm Pond;*
	    F = Fish And Wildlife Pond;
	    D = Debris Control;
	    T = Tailings;
	    O = Other.
	
	Codes are concatenated if the dam has multiple purposes. Order indicates relative decreasing importance of the purpose. (A8)			

PRM_PURPOSE	*Term indicating the primary purpose for which the reservoir is used. A calculated field based on the leading code provided in field item PURPOSE. Terms used are as follows –*
	        Irrigation;
	        Hydroelectric;
	        Flood Control;
	        Navigation;
	        Water Supply;
	        Recreation;			

DamCat Field Names & Definitions					
qo	Non-Breach flow -Spillway & overtopping which occurs with the maximum breach flow.		3a	NON-BREACH FLOW	CFS
return_flow_region	Return Flow Region	**Dam - Return Flow Region**	3a		
rfc	River Forecast Center	**RFC** **Offices - RFC**	1 3a		SERFC etc.
river River or Stream RIVER	Name of the River. Official name of the river or stream on which the dam is built. If the stream is unnamed, it is identified as a Tributary ("TR") to the named river. If the dam is located offstream, the name of the river or stream is entered plus "-OS" or "OFFSTREAM". (A30)	**River** **Dam - River**	1 3a		
sa	Starting surface area of reservoir at dam crest.		3a	SURFACE AREA OF RESERVOIR	Acres
scenario	Dam Failure Scenarios HF - High Fast HN - High Normal MF - Mid Fast MN - Mid Normal	Dam Failure Scenarios HF - High Fast HN - High Normal MF - Mid Fast MN - Mid Normal	3a 3b1 3c2		

DamCat Field Names & Definitions

section_t_r Section, Township, Range	Dam location in terms of Section, Township, and Range.		3a		
SECT_TOWN	Dam location in terms of Section, Township, and Range. Meridian location is included if it is needed to locate the dam. (A30)				
slope	Slope of the river channel from the dam to the forecast point.		3a		FT/MI

DamCat Field Names & Definitions					
source_agency *Primary Source* *Agency*	*Code identifying the federal or state agency that has provided the data for the dam characteristics.* *Note: It is assumed that data from the following categories are given in source_agency –*		*3a*		
SOURC_AGCY	*Code identifying the federal or state source agency that has provided the field data on the dam, with the exception of field items: SPILL_TYPE, SPILL_WIDTH, NUM_LOCKS, LOCK_LEN, LOCK_WIDTH, and VOLUME.(See SUPP FED AGENCY for the supplemental source agency). The code used for a state source agency is the two letter abbreviation for the state; the code used for a federal source agency is the Federal Agency Code defined in the table above. (A9)*				
Primary Source Date *SOURC_DATE*	*Date of the transmittal submitted by the primary source agency. (See SOURCE AGENCY)*				
SOURC_ID	*The official agency identification number for the dam, used by the source agency's local dam inventory system. See SOURCE AGENCY for the name of the agency. (A15)*				

DamCat Field Names & Definitions

			3a		
source_agency # Continued *Suppl Fed Source* *Agency* *SUPP_FED*	*Code identifying the federal agency that has provided the data for field items: SPILL_TYPE, SPILL_WIDTH, NUM_LOCKS, LOCK_LEN, LOCK_WIDTH, and VOLUME. These supplemental field items are specific to the federal agency transmittal. The code used is the Federal Agency Code given in the table above. (A9)*		3a		
Suppl Fed Source *Date* *SUPP_DATE*	*Date of the transmittal from field item SUPP FED AGENCY.* *Code identifying the federal or state source agency that has provided the field data on the dam, with the exception of field items: SPILL_TYPE, SPILL_WIDTH, NUM_LOCKS, LOCK_LEN, LOCK_WIDTH, and VOLUME.(See SUPP FED AGENCY for the supplemental source agency). The code used for a state source agency is the two letter abbreviation for the state; the code used for a federal source agency is the Federal Agency Code defined in the table*				

DamCat Field Names & Definitions

spillway_type *Spillway Type* *SPILL_TYPE*	*Code that describes the type of spillway –* *C = Controlled;* *U = Uncontrolled;* *N = None. (A1)* *(Field data item specific to federal agency transmittal)*				
spillway_width *Spillway Width* *SPILL_WIDTH*	*Width of the spillway in feet, available for discharge when the reservoir is at its maximum designed water surface elevation. (Numeric)* *(Field data item specific to federal agency transmittal)*				*FT*
src	*Originating Office of DamCat messages and Dambreak model runs.*		*3a*		*TAE SERFC etc.*
st_reg_agency *State Regulatory Agency* *STATE_AGCY*	*State Regulatory Agency indicating name of the primary state agency with regulatory or approval authority over the dam.* *Name of the primary state agency with regulatory or approval authority over the dam. (A30)*		*3a*		

DamCat Field Names & Definitions

st_reg_dam	*Code indicating whether the dam is regulated by the state (Y=yes, N=no).*		*3a*		*Y,N*

stateid
 State
 	
    STATE
 	
    STATE_NAME
	State Dam Identification Number.
	
	 The state name in which the dam is located. A calculated field based on the NID ID. (A2)
	
	 The state name in which the dam is located. A calculated field based on the NID ID. (A20)
		Dam – State ID	*3a*		

stordis	*Reservoir capacity volume (acre-ft) or discharge (cu ft/sec) from the spillway at the given elevation.*				*ACRE – FT* *or CFS*

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DamCat Field Names & Definitions

structural_height *Structural Height* *STRUCT_HGT*	*Structural Height of Dam.* *Structural height of the dam in feet. It is defined as the vertical distance from the lowest point of the excavated foundation to the top of the dam.* *Because the "height" of dam definition used by each of the participating state and federal agencies varies, three different height fields are provided in the national database. Each agency is requested to enter values for the height field item(s) that most closely correspond to the height of the dam definition(s) used by the agency. Structural Heights that do not correspond to agency data may be left blank. To facilitate database queries, a single height value has been calculated for each dam based on the information transmitted for this field. See item NID HEIGHT. (Numeric)*	**Construction –** **Structural Height**	*3a*		*FT*
surface	*Reservoir surface area (acres), C for Capacity, and S for Spillway.*				*Acres*

DamCat Field Names & Definitions

surface_area *Surface Area* *SURF_AREA*	Surface area in acres of the impoundment at its normal retention level. (Numeric)	**Construction -** **Surface Area**	3a		Acres
tfm	Time of failure. Time for breach to develop.		3a	TIME OF DAM FAILURE	MIN
time_deflood	The time required for flow to fall below flood level.		3a		HOURS
time_flood	The time to reach flood level at the forecast point.		3a		HOURS
time_max_depth	Time to the max depth at the forecast point.		3a		HOURS
topo_map	Topographic map.	**Dam** **- Topo Map**	3a		
tw	Top width of pair.			TWIDTH [BS(K,I) - OF K-th channel width of I-th cross sectional.]	

type	Indication of capacity or discharge information. Code -
	    S = spillway,
	    C = capacity.				

updated	Date/time of last record modification.	Updated	3a		
vol	Starting Volume of the Reservoir	**Vol**	1	VOLUME OF RESERVOIR	Acre-FT

DamCat Field Names & Definitions

volume_dam *Volume of Dam* *VOLUME*	*Total number of cubic yards occupied by the materials used in the dam structure. Portions of powerhouse, locks, and spillways are included only if they are an integral part of the dam and required for structural stability. (Numeric)* *(Field data item specific to federal agency transmittal)*	**Construction – Volume Material**	*3a*		*YD3*
width_locks *Width of Locks* *LOCK_WIDTH*	*Width of the primary navigation lock in feet. (Numeric)* *(Field data item specific to federal agency transmittal)*				*FT*
xsec_type	*Type of cross section.*		*3a* *3b2* *3c3*		
year_completed *Year Completed* *YEAR_COMPL*	*Year when the original main dam structure was completed, "0000" – for unknown year.* *Year when the original main dam structure was completed. (Numeric)*		*3a*		
year_modified	*Year when the original main dam structure was modified.*		*3*		